The struggles, successes and disappointments of carrying out Action Research: A reflective analysis of a 25 week syllable intervention across two schools focusing on improving reading and spelling in young children aged between five and nine years old.

This dissertation is submitted for the degree of
Doctor of Education

Christopher John Halls

Homerton College, Cambridge

Submission: April 2021

Preface

Title: The struggles, successes and disappointments of carrying out Action Research: A reflective analysis of a 25 week syllable intervention across two schools focusing on improving reading and spelling in young children aged between five and nine years old.

Name: Christopher John Halls

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Declaration:

- This dissertation is submitted for the degree of Doctor of Education.
- This dissertation is the result of my own work and includes nothing which is the outcome of work done in collaboration except as declared in the Preface and specified in the text.
- It is not substantially the same as any that I have submitted, or, is being concurrently submitted for a degree or diploma or other qualification at the University of Cambridge or any other University or similar institution except as declared in the Preface and specified in the text. I further state that no substantial part of my dissertation has already been submitted, or, is being concurrently submitted for any such degree, diploma or other qualification at the University of Cambridge or any other University or similar institution except as declared in the Preface and specified in the text
- It does not exceed the prescribed word limit for the relevant Degree Committee.

Summary

Name:
Christopher John Halls

Title:
The struggles, successes and disappointments of carrying out Action Research: A reflective analysis of a 25 week syllable intervention across two schools focusing on improving reading and spelling in young children aged between five and nine years old.

Summary:
This thesis chronicles the successes, struggles and disappointments of carrying out Action Research with 15 members of staff and 300 children from various year groups across two schools. The research centres around a 25 week intervention aimed at improving syllable awareness with the view it might benefit reading and spelling development. To measure this, pre- and post-test data was compared as well as carrying out interviews with participants. The findings suggested that whilst the intervention made a difference in improving syllable awareness, this did not translate to significant reading or spelling progress. These findings do, however, run contrary to the growing literature presented within the thesis which argues that syllable awareness has an integral role in phonological development. Consequently, the thesis reflects on the shortcomings within the work: some were unavoidable considering the size and scale of the project, whilst others could have been mitigated with better planning. Crucially, however, all of these factors highlight the realities of carrying out Action Research in the ‘messy environments’ (Cain, 2019) of school. This thesis therefore offers the reader a detailed account of the personal growth which took place as a result of completing this EdD, as well as the change it had on a professional and institutional level.

Keywords:
EdD; Action Research; intervention; reflection; syllables; phonics; reading and spelling

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Glossary of Terms

Analytic Phonics: is a particular approach to teaching reading and spelling which does not look at phonemes in isolation. Instead, it looks at larger sets of graphemes, e.g. onset and rime.

Grapheme: is a letter which represents a single phoneme. Sometimes a group of letters connect to represent a phoneme.

Onset and rime: work together to form a syllable. The onset is usually the beginning consonant and the rime is the vowel-consonant ending. For example in the word ‘sun’, s- would form the onset and -un would form the rime.

Phoneme awareness: is the ability to link grapheme-phoneme correspondences (Engen and Høien, 2002). For example identifying the letters n-igh-t and corresponding them to the sounds /n/aɪ/t/.

Phonemes: is the term used to describe the ‘smallest unit of sound which is capable of making a difference in meaning’ (Eyres, 2003: 38). For example ‘bat’ differs from the word ‘cat’ by the phoneme [b].

Phonics: is an over-arching term used to describe a way of teaching reading skills (Ehri and Nunes, 2003). For example ‘synthetic phonics’ is a type of phonics programme.

Phonological awareness: is the ability to recognise phonemes in words, but not explicitly. It can also refer to segmenting words into syllables and other larger chunks such as morphemes (O’Connor et al., 2009).

Prosody: from the latin ‘*prosodia*’ meaning accent of a syllable, prosody refers to stress and rhythm of words/syllables.

Syllable: is a unit of speech, either a whole or part of a word, usually formed by an onset and rime (see above).

Synthetic Phonics: is a particular approach to teaching reading and spelling which focuses on phoneme - grapheme correspondence.

List of Abbreviations

AR	Action Research
EAL	English as an Additional Language
EEF	Education Endowment Foundation
KS1/2	Key Stage One/Two
MBITSD	Multiple-Baseline Interrupted Time-Series Design
PAR	Participatory Action Research
RQ	Research Question
RWI	Read Write Inc.
SDT	Syllable Deletion Task
SLD	Specific Learning Difficulty
SRT	Salford Reading Test
SWST	Single Word Spelling Test

Acknowledgements

Behind these eighty thousand words are a lot of people who need to be thanked. First and foremost, a special thank you to my supervisor, for giving me the space to grow and the direction to learn. Second, I am obviously indebted to my school. To my two Headmasters who always supported me and to R who inspired me to undertake an EdD. To my colleagues who listened when I was stressed and advised me when I needed help. Finally, to everyone who took part in the intervention, in one way or another, thank you to you all, for without you I could not have done it.

I must also extend a special thank you to my parents, for their unwavering support throughout my entire education and their constant encouragement, and to my partner, for her constant understanding and giving me the time to spend days typing at my desk.

Part A - The EdD Journey

(A) 1, Introduction

Written January 2021.

My EdD journey began by asking myself an overarching question: does syllable awareness play an important role in early literacy development? Over the last seven years I have endeavoured to read, review and research this question and now feel that I am in a position to be able to share my findings.

The research focuses on an intervention which spanned one academic year (2016-17): 25 weeks of teaching in total. The aim behind the intervention was to better understand whether syllable awareness could be improved and, if so, explore the impact it might have on reading and spelling development. To achieve this, I began by designing an experiment with 15 members of staff who were split into two groups, either teaching an extra five minutes of syllable instruction or teaching an extra five minutes of synthetic phonics to nearly 300 participants. I compared pre- and post-test data for syllable awareness, reading and spelling progress, whilst also triangulating findings by interviewing staff and participants to examine the impact of the intervention holistically.

This intervention was, however, inextricably linked with the unique successes, struggles and disappointments of undertaking such a piece of Action Research (AR). Cain (2019: 136) notes, “Teacher research happens in the real and messy environments of schools,” and my own attempt to implement this intervention resulted in many points for reflection. Crucially, working across different settings allowed me to consider the similarities and differences between being an ‘insider’, conducting research within my own class (Anderson et al., 2007), as well as an ‘outsider’, asking others in different year groups and settings to conduct similar work. Furthermore, this experience of working both as an ‘insider’, as well as an ‘outsider’, allowed me to recognise the many mini-triumphs along the way, as well as identify the shortcomings within the work.

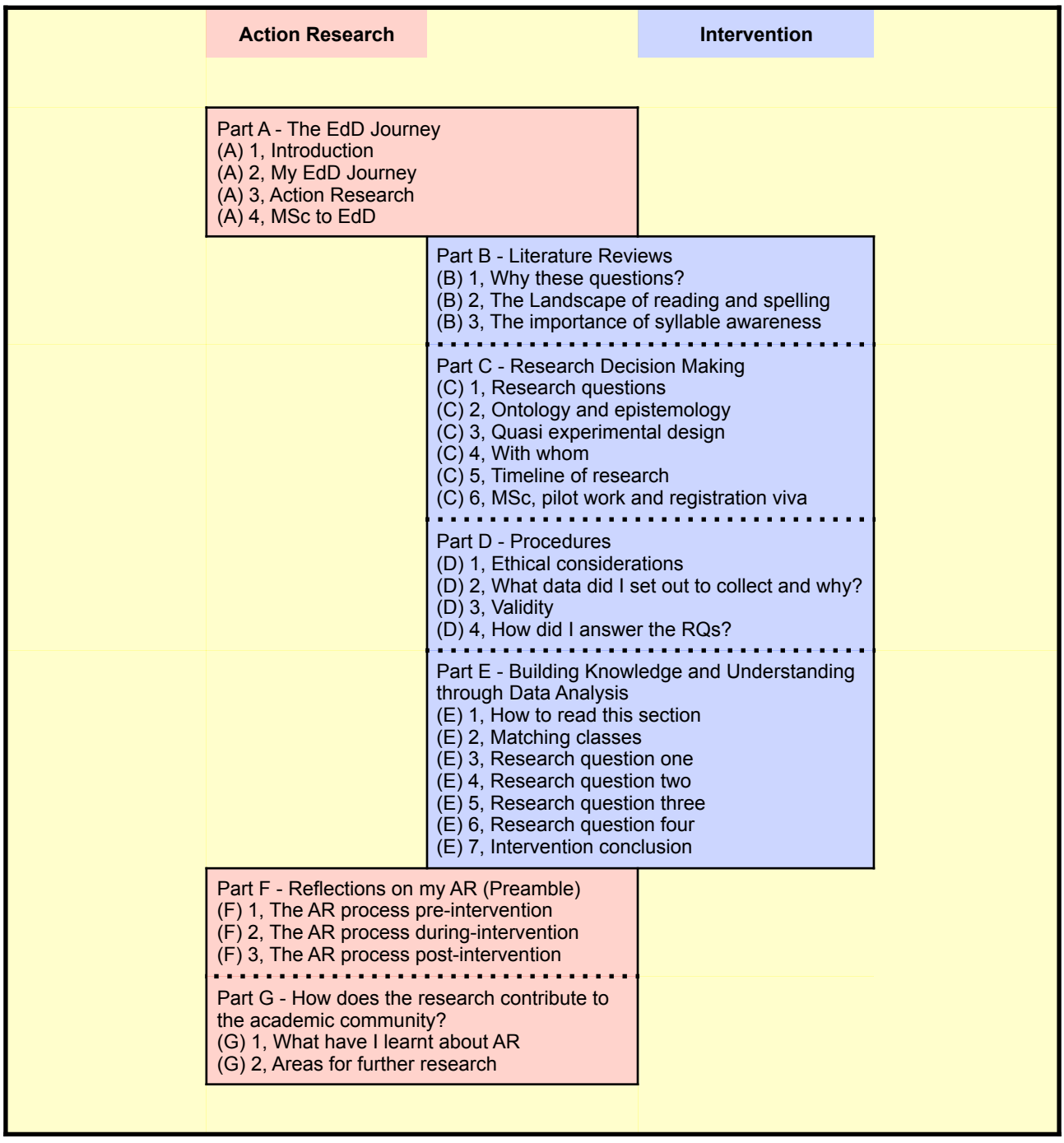
For example, undertaking such an ambitious intervention so early in my teaching career forced me to develop leadership skills which I had not previously gained. It accelerated my ability to lead others within an educational setting, and improved my confidence to implement curriculum changes in two schools. As a result, embarking on this EdD has unequivocally contributed to my professional and personal development. Conversely, as will be made clear throughout this thesis, there were some decisions which, in hindsight, were not always the most favourable nor optimal. Some of these were the result of carrying out such a large AR project and therefore unavoidable. For instance, as the intervention began it was clear that I had not fully considered just how challenging it would be to ensure intervention fidelity with so many teachers across two settings. Other decisions, such as the choice of testing instruments and the rigour with which I approached validity, were errors I would be unlikely to repeat were I to carry out a similar AR project in the future.

Consequently, despite this thesis's initial intention to focus on the outcomes of a literacy based intervention, I believe there is now equal, if not greater value in sharing my account of carrying out AR. Whilst the intervention has intrinsic value as an experiment aimed at improving literacy development, it serves a further important function as being the catalyst which has allowed me to reflect on teaching practice and therefore grow and develop professionally and academically. In this respect, my EdD shares some structural similarities with the writing technique of '*mise en abyme*' whereby the intervention has found itself becoming a 'play within a play' to highlight the various processes which underly AR (PCS, 2013). In other words, I use the intervention to highlight my experience of AR so that others can hopefully learn from my experience. In doing so, I also share the impact of carrying out AR and hopefully contribute to the growing literature which documents the empowering effect AR can have (Mertler, 2017; Garcés et al., 2016; Lebak and Schule, 2014; Rodgers, 2002; Pain, 2012).

To portray this truthfully, I have structured this thesis as a portfolio comprising seven main sections which are broken into further subsections, all written at different times during my EdD. This portfolio approach has several important benefits. First and foremost, it allowed me to write little but often throughout the EdD, something which was crucial as a part-time student and full-time teacher. Second, it allowed me to write concurrently to where I was in the research timeline, thereby giving the work greater authenticity and trustworthiness. Finally, and perhaps most importantly, by writing my EdD as a portfolio it

allows the reader the opportunity to decide how they wish to read the thesis: either 'cover-to-cover' or by choosing sections of interest. In doing so, this 'play within a play' is allowed to come to the fore. I have tried to visualise this in Table A1.1 below:

Figure A.1.1 My 'Play within a play'



As the table hopefully shows, the intervention focusing on improving reading and spelling development begins in section B, which critically examines the key literature underpinning our current understanding of literacy development. It also critically evaluates the role

syllable awareness plays in our daily use of phonics. As a result of this literature review, research questions (RQ) are formed in section C as well as detailing a research design which is subsequently adopted for the intervention. The method for data collection is outlined in section D with section E presenting, analysing and discussing the findings.

The core principles of AR are discussed in section A. Section F is a detailed reflective critique of carrying out the intervention, including a truthful analysis of fidelity and overall research rigour leading to a conclusion in section G. This concludes with a final subsection on areas for future research which draws both strands of the thesis back together. The overarching aim in presenting this 'play within a play' is to truly capture, as Cain (2019) says, the 'reality' of teacher AR within the 'messy environment of school'.

Consequently, the remaining subsections of this section (A) hopefully complete this introduction to this thesis. A.2 is a reflective piece detailing my changing views on how my professional identify as a Key Stage One teacher intertwines with my academic pursuits of AR. A.3 begins to position this work within the AR literature; in particular commenting on where it sits on the spectrum of AR and Participatory Action Research (PAR). Finally, A.4 explores the beginnings of this EdD journey through the early work completed as part of my MSc. Together these four subsections of section A hopefully introduce the key principles underpinning this EdD and my subsequent research.

(A) 2, My EdD journey

First written in May 2017, final edit January 2021.

A.2.1 Preamble

This short paper has, over the years, been edited numerous times and used in varying capacities throughout my doctorate. It was initially submitted at the 2017 Cambridge EdD Conference as a poster which I presented at a workshop [1]. This was with the aim of sharing my experience of conducting AR and implementing an intervention across two settings. Later, the paper itself became a reflective piece on my EdD journey which I discussed in a seminar to an audience of academics, doctoral colleagues and prospective students. In doing so, this paper represented a milestone in engaging more critically with the wider academic community: a step towards assuming the role of a 'researching professional' (Bourner et al., 2000).

Since 2017 I have continued to add to this paper and in doing so it has remained a constant reference point in understanding my EdD journey. It epitomises the cyclical nature of AR by mapping how, at various different stages within the doctorate, I reflected on my practice and sought ways to improve it.

For all these reasons, this paper merits its inclusion at the start of this thesis. It will, I hope, give a clear understanding of my own development as a researching practitioner and its impact on my research and this body of work.

A.2.2 Year one

Like many EdD students, I found myself cohabiting the domains of professional teacher and academic researcher. I know I am not unique in this but I am also certain that this has shaped me as a person. For example, I have never known teaching without academic

[1] See Appendix H.8 for a copy of the poster.

research. Likewise, I have never known my research without the structure of my school setting.

This thesis has spanned a period in my life where I have undergone considerable change and as a result this work has had a strong hand in shaping who I am today. Flutter (2016) writes that doctoral students face 'a transformative journey' from practitioners to researching professionals, and my own reflections on this doctorate would echo this. This idea is also put forward by Kamler and Thomson (2014) who suggest that this is because an Educational Doctorate is a 'journey' through which the person undertaking the course experiences a 'transition of identity' from student to scholar.

In my first year of the doctorate, the notion of a 'transitioning identity' resonated with me and was something I was keen to understand better. I have included table A.2.2 below because it was my first attempt at mapping out where I was at the beginning of my journey and where I wanted to be when I finished. Despite its simplicity, I have often referred back to it to remind me that my aim with this body of work is to become a 'specialist' in my chosen field.

Table A.2.2 The Identity of the Researcher

	Identity began	**→ 'journey' →**	**Identity becomes**
EdD	Teaching **professional** (profession: type of work that needs special training or a particular skill, often one that is respected because it involves a high level of education) *and* **Student** (A person who is learning at a university or college)	→ EdD 'journey' → Photo of road removed for copyright reasons. Copyright holder not know.	Teaching **professional** (profession: type of work that needs special training or a particular skill, often one that is respected because it involves a high level of education) *and* **Scholar** (A person who studies in great detail, especially at a university)

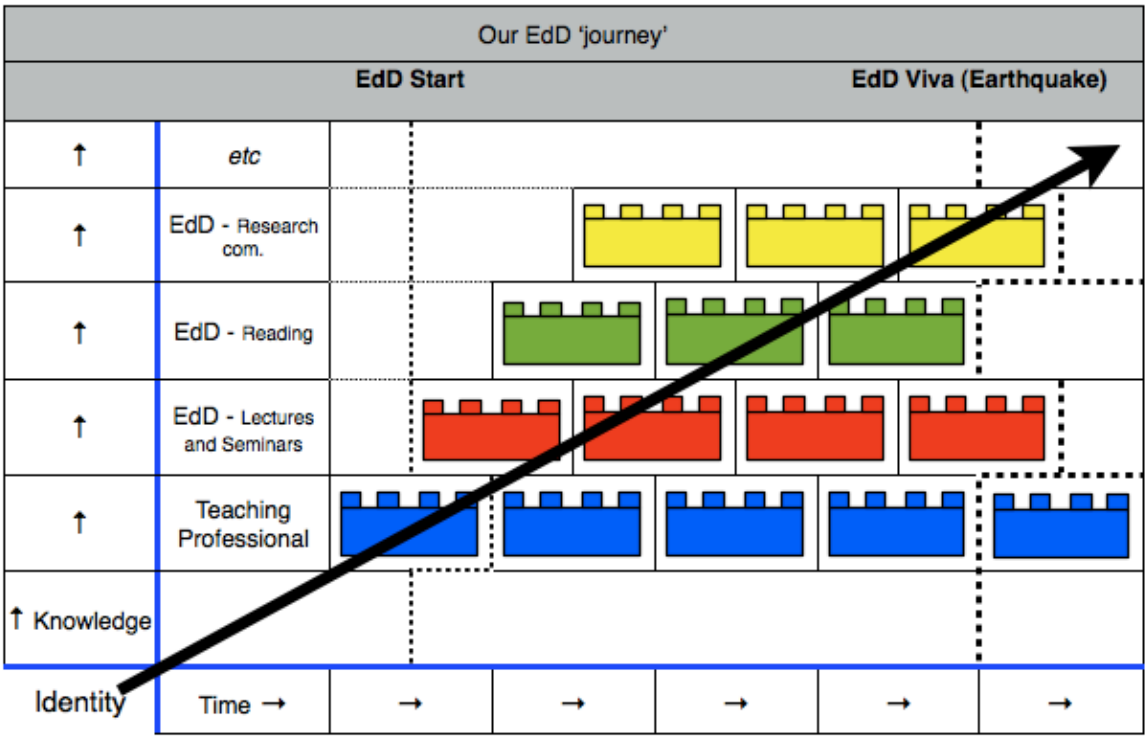
(profession, 2020), (student, 2020) and (scholar, 2020)

A.2.3 Years two and three

In my second year I was preparing for my EdD registration viva. The more I immersed myself in my research, the more I felt the terms 'journeying', 'transitioning' or 'taking up a

new position of expertise' (Flutter, 2016; Kamler and Thomson, 2014) suggested that I was moving from one place to another. Furthermore, I felt the words could imply that the old place/identify/belief was being replaced by a 'new' version. I found this conceptualisation of 'journeying' problematic. I found myself asking how the concept of journeying could be applied to a professional doctorate when the identity of the individual was tied so heavily to their professional background? Consequently, I wanted to visualise my 'journey' towards my EdD viva in a new way which table A.2.3 endeavours to do.

Table A.2.3 The EdD Journey



I no longer viewed 'journeying' as a transition from one identity/place to another, but rather as an 'additive' process. In other words, a professional doctoral student uses their 'journey' to *build* an identity. Wellington (2010) describes the research 'journey' as a 'vehicle for personal development, learning and growth'. Consequently, whilst linking the 'journey' during a professional doctorate to an identity-forming process is not a new idea, I tried to develop this model by visualising how the experiences before the EdD, as well as my motivation to engage with it, created biases which contributed to the identity forming process (Griffiths, 1998). I tried to reflect this in the model with the blue professional brick which exists before the start of the course. What this endeavoured to show was that previous research and professional interests will already have influenced my identity as a

researcher and consequently determined parts of my current and future 'journey'. I explore my own biases in greater detail in subsequent sections.

A.2.4 Years four and five

My views for the first couple of years of my doctorate were very two-dimensional. The concept of my 'journey' represented in bricks which built upon each other was a very linear view and overly simplistic. Perhaps unsurprisingly the way I approached my EdD Registration Viva reflected this rigid linear disposition towards 'journeying' where everything built upon the section before it - just like the bricks. I have copied an extract of my plan for this Registration Viva below in table A.2.4.1:

Table A.2.4.1 EdD Viva Timeline Contents

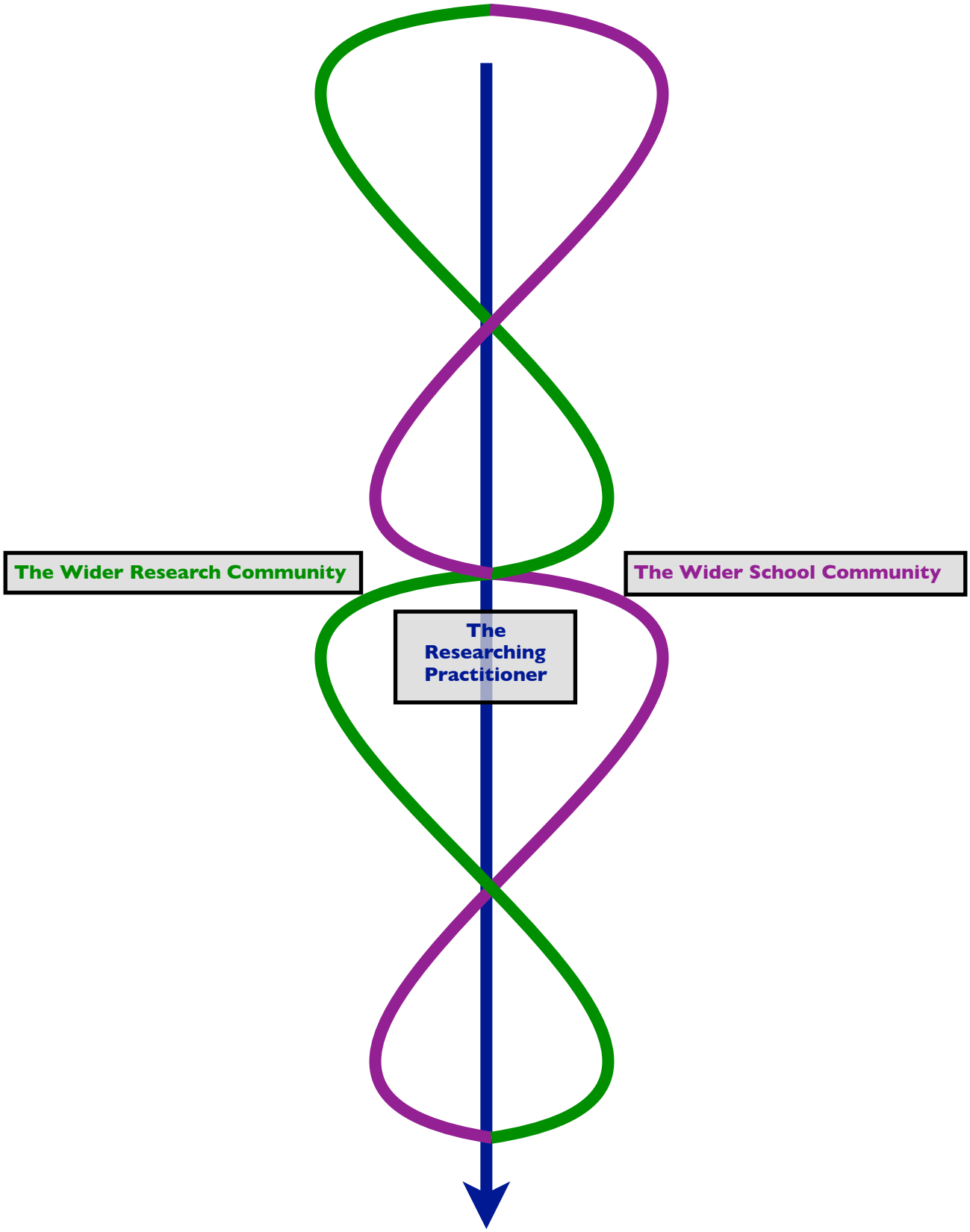
Section	Components	Words	Date Completed
Introduction	Shape of the study - structure - how to read it? Golden thread	250 words	September 2015
	Who am I?	250 words	October 2015
	Why am I motivated to complete an EdD? Aim?	250 words	October 2015
	Summary of MSc research	1000 words	October 2015
	How has my thinking changed	250 words	December 2015
	Links to professional background	250 words	October 2015
Literature Review	Introduce the literature review - Why am I asking these questions	50 words	December 2015
	How do children learn to read?	3000 words	September 2015

Whilst this timetable/contents page successfully structured my thinking and carried me through the registration viva, I found myself stuck compiling a contents page for the final thesis. Upon reflection I realised I was missing my voice, the narrative that explained the cyclical nature of my AR project.

The above conceptualisation(s) and subsequent contents page omitted my 'identity'. One of the most important parts of carrying out the intervention was the constant decision

making I had to make with others. I was neither school focused nor research focused; I remained somewhere in the middle. The more I reflected on my year conducting research, the more I realised my 'journey' was more complicated, more interwoven and consequently my contents page and final thesis needed to reflect this. Figure A.2.4.2 below is how I began to depict my EdD journey in these final years:

Figure A.2.4.2 EdD ‘Journey’ (Version 2)



The first thing to note is that I believe there are two main strands which are integral to my 'identity' as someone undertaking a piece of AR as part of a professional doctorate:

1. The school community - my professional interest, my professional environment, my class, my year, my teacher colleagues, my school.

2. The research community - my field(s) of academic interest, my faculty, my supervisor, my community of EdD colleagues.

As the name suggests, I view the professional doctorate as an 'identity forming' process where the profession is interwoven within the doctorate. Furthermore, it is precisely where the two strands meet that I believe my 'identity' is being formed. I have described these intersections as 'pinch points' because they often represent tensions and the dichotomy I felt as a professional researcher conducting AR. For example, the wider research community would value my efforts in collecting more data through greater testing (Mertler, 2017). This, however, runs in direct opposition to the wider school community who would appreciate my every effort to reduce their workload, thereby creating a 'pinch point' where I was torn between the two strands.

Finally, whilst implementing the intervention, I came to appreciate how the school environments have helped me build my identity. Upon reflection, the support and opportunities I have been given have acted as a catalyst to help speed up my 'transitioning identity' on this EdD journey. This is not just through the opportunities the schools have given me to improve my practice, or the support to spend time working on my research but also the exposure to work with forward thinking colleagues. Opfer and Pedder (2011: 4) write that: "[…] schools play such a significant role in providing the support and capacity necessary for improvements," and I have been fortunate to work under two outstanding headmasters who placed enormous value on progressing the knowledge of all teachers. Furthermore, the importance they placed on furthering the qualifications of all their teachers - not just because they knew it would benefit the individual and children in their care, but also the school as a whole - changed my view on teaching, something I discuss further when I explore AR in the next section.

A.2.5 Years six and seven

In the final years of this EdD I have often found myself returning to Strauss and Corbin (1998: 30) who write that:

> "*[…] research may be conceived of as a circular process, one that involves a lot of going back and forth and around before finally reaching one's goal*."

As I reflected on implementing the intervention it was clear that when writing this thesis I wanted the AR process to shine through. I wanted the reader to be aware of the circular nature of AR and appreciate how this cyclical process impacted my work. It was also important for me to convey equally the advancement in understanding but also the inevitable setbacks I faced. In short, the thesis needed to reflect the '*going back and forth*' in my effort to better understand "*my goal*".

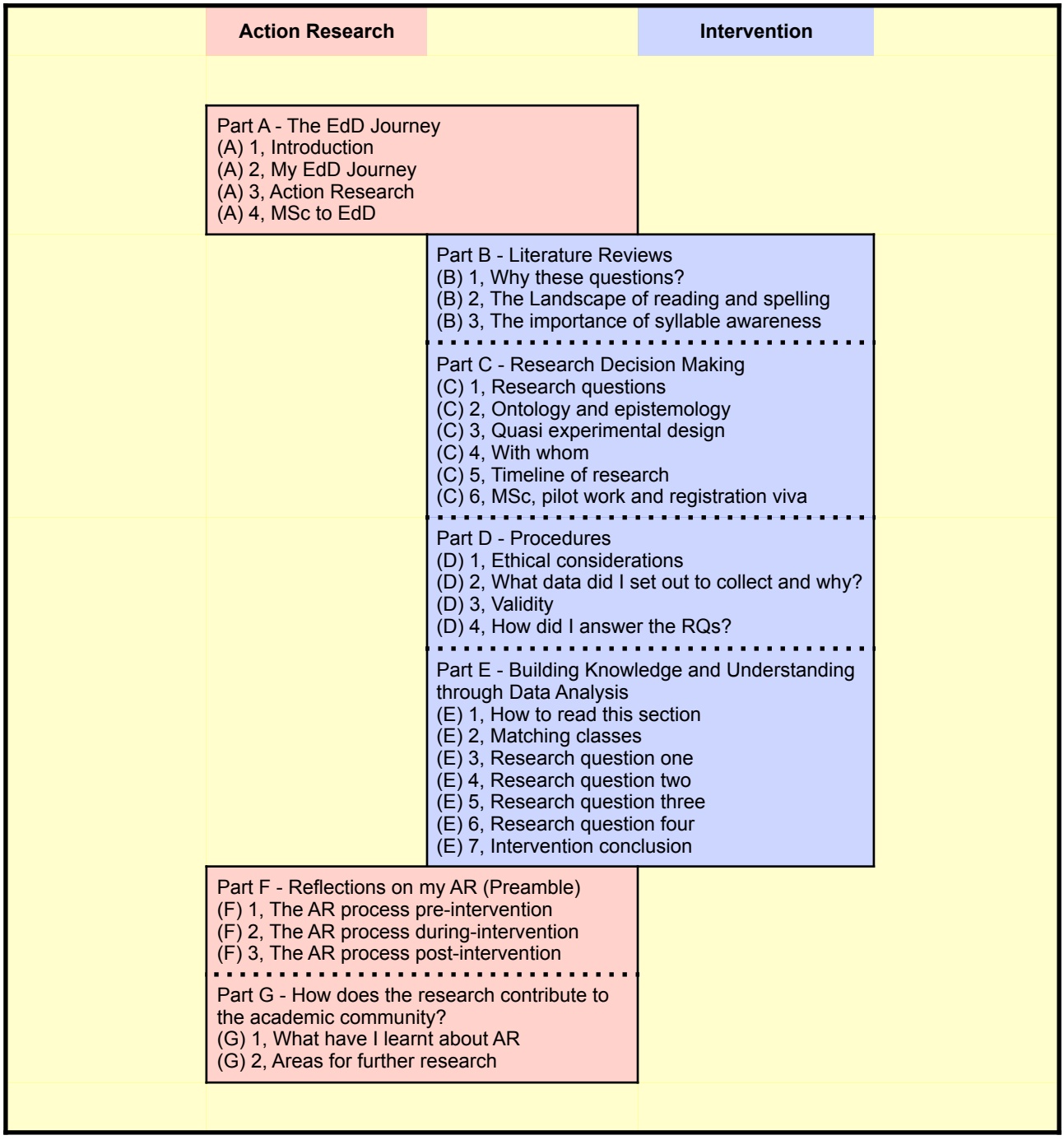
Initially, I began by creating a hybrid of my 2016 Registration Viva and my 2017 Double Helix figure. Table A.2.5 below is an example of how I first approached writing this thesis that, on the surface, might look like the 2016 EdD Viva Registration table with a word count and completion date. The difference, however, was in the left hand column where I included a running reflective title for the section and colour coded it to the corresponding subsections within that section where my reflection was most prominent.

Table A.2.5 June 2018 Contents Page

Running Reflection	Section	Components	Target Words	Actual Words	Date Completed
An EdD Journey	Part A - The EdD Journey	Introduction	500	469	May 2018
		My EdD Journey	1500	1800	June 2017
		Action Research	2000	2100	January 2018
		MSc to EdD > Changed thinking or continued motivation?	500	752	August 2015
		Positioning myself and this research within the field of educational research - Who will this interest?	1000	897	December 2017

One of the great advantages of the Educational Doctorate at Cambridge University is that the researcher is encouraged to present their final thesis in a way which reflects their unique relationship between their academic research and their teaching profession. As already expressed in subsection A1.1, my intention from the very beginning has always been to structure this thesis as a portfolio. Despite this unwavering decision, the thesis itself has gone through several rewrites since the 2018 ‘Hybrid’ idea. Most noticeably, the final rewrite has been reformatted to allow the realities of AR to be brought to the fore through presenting my EdD as a ‘play within a play’. Table A1.1 introduced in the previous subsection (and copied again below) visualises this concept.

Figure A.1.1 My ‘Play within a play’



This model retains the key principles of the 2018 ‘Hybrid’ idea that ‘pinch points’ within the EdD where decisions had to be made helped nurture personal growth and led to institutional change. These ‘pinch points’ are the realities of AR and therefore become *the* foundation upon which to explore the intervention. It is the ‘mise en abyme’ [2] which

[2] ‘Mise en abyme’ stemming from the French ‘placed into abyss’ as a technique used in plays to highlight plot line.

highlights reflection and therefore connects the academic research with my professional development. Strauss and Corbin (1998: 30) go on to write that research is a “flow of work” which “evolves” throughout the entire project. It is my hope that this evolution within my own work becomes equally clear, from the first day in October 2013 to submitting the thesis in April 2021.

(A) 3, Action Research

Written in April 2020.

A.3.1 Preamble

> *"If we knew what we were doing, it wouldn't be called research."*
>
> *Chevalier and Buckles (2019: 71)*

A.3 introduces AR, both as an approach to conducting research and the 'whys' and 'hows' of adhering to it. I must stress, from the very outset, that I return to AR throughout this thesis, especially in section F when I explore the reality of implementing my intervention. Nevertheless, I felt compelled to include this opening section as close to the beginning of this thesis as possible because AR is the foundation to this thesis.

As the quote from Chevalier and Buckles succinctly summarises, research, at its very core, is about stepping into the unknown and my own experience of implementing an intervention has been no different. There were countless moments when I felt unsure of what to do but the cyclical reflections inherent in AR have guided me, as well as retrospectively highlighting the shortcomings. Consequently, the aim of this subsection is to introduce the concept in such a way that it is able to guide the reader through the remaining thesis.

Finally, I want to mention that at the time of writing and implementing the intervention, I was unaware of Design Research. Since carrying out the intervention and reflecting on the successes and difficulties of carrying out my research, I have become increasingly aware of Design Research. Therefore, whilst I make no reference to Design Research in this introductory section on AR, I will return to it in the final subsection G.2.

A.3.2 Action Research

AR has evolved over the last half-century and is now successfully used world wide (Holter and Frabutt, 2012). Whilst its use in research is still not as prevalent compared with more traditional methodology (Mertler and Charles, 2011), its roots can be read in the work of Dewey (1933) and Lewin (1948) who were interested in improving the practice of the researcher through purposeful reflection. This interest in self-improvement was later expanded on by Schön in the 1980s with the term 'reflective practitioner' (Morale, 2016). Crucially, AR has developed from the work of Dewey and Schön by encouraging researchers to adopt a more structured approach to their reflective practice so that conclusions drawn are supported by evidence (Anderson et al., 2007). Therefore, whilst AR is still regarded as an inherently reflective process exploring the whats, whys and hows of teaching (Mertler, 2017), the advancement of knowledge has become equally important (Morales, 2016; Chevalier and Buckles, 2019). This advancement of knowledge also distinguishes AR from 'action inquiry' which uses research methods to solve a problem without contributing to the development of knowledge (Chevalier and Buckles, 2019).

Perhaps most importantly, AR differs from other more traditional approaches to research by insisting that research is not solely aimed at university academics but equally at school practitioners. It empowers those who engage with it to use their own 'expertise, talents and creativity' as part of the research process to benefit the students in their care (Johnson, 2008). Tekin and Kotaman (2013) note that AR has benefits in helping teachers improve their teaching due to the ease with which it can be implemented into the class setting. By doing so, the impact of the research can directly affect the setting in which the research takes place (Anderson et al., 2007).

A.3.3 Working with others in AR

"*Conversations spark ideas."*
(Cain, 2019: 40)

AR begins with an observable problem (Lebak and Schule, 2014; Tekin and Kotaman, 2013), although the process of conducting AR is not just about solving problems. It is about maintaining the solving process (self-sustained learning) which is only possible through being directly involved in the research (Morales, 2016). Therefore, AR aims to observe the social reality from within (Cain, 2019; Anderson et al., 2007). Mertler and Charles (2011: 339) summarise this by writing that:

> "*[…] possibly most importantly, action research provides educators with alternate ways of viewing and approaching educational questions and problems and with new ways of examining our own educational practices*."

As a Year One teacher I was teaching synthetic phonics every day but increasingly felt that something was missing as children were still failing to read and spell accurately further up the school. Teaching synthetic phonics did, however, allow me to research the issue from within (Anderson et al., 2007). Furthermore, as I discussed my reservations about synthetic phonics with colleagues it became clear that I was not alone in thinking more could be done to improve our phonics teaching.

Over time, what began as a conversation with colleagues turned into setting up an intervention which actively involved colleagues throughout the school. In doing so, I felt a need to reflect on different AR models which I found well illustrated by James (2012) [3]. From reading the different variations of AR, I realised that my design shared some similarities with that of 'Participatory Action Research' (PAR).

[3] James, Slater, and Bucknam (2012) list just a selection of 'Action Research Cousins': action science (AS), participatory action research (PAR), community- based participatory research (CBPR), action learning (AL), appreciative inquiry (AI), living theory (LT), and participatory action leadership action research (PALAR).

PAR comprises: participation (life in society), action (experience) and research (production of knowledge) (McIntyre, 2008). PAR can be swapped for a variety of similarly named approaches such as: Participatory Appraisal, Participatory Learning and Action, Community-Based Participatory Research (Pain et al., 2012). Irrespective of the exact wording, the commonality with all is that it encourages all those involved in the process to be a part of the research. They become 'equal partners' in both the preparation and improvement of the programme (Tekin and Kotaman, 2013). Unlike AR where the aim is to conduct research 'on' people, PAR endeavours to research 'with' people (Chevalier and Buckles, 2019). In other words, PAR breaks the traditional model of the researcher researching a 'subject', by flipping this on its head so that the researcher instead becomes one of the 'participants' (Anderson et al., 2007).

This idea of 'becoming one of the participants' is what initially drew me to a PAR approach. This was because my desire to improve the learning outcomes for children would carry very little value if it was too challenging or unrealistic to be implemented by teachers in school. As my intervention required a break from what had historically been taught in my school, I found myself just as interested in how the teachers would implement the intervention, as how the children would respond to it. Consequently, I was intrigued by how the teachers could become part of the research process.

Another commonly cited benefit of PAR is that by working closely with colleagues, the calibre of research is enhanced by collectively questioning that which is established (Morales, 2016; Holter and Frabutt, 2012; Clauset, et al., 2008; Anderson, 2007) and finding solutions together through a more sophisticated analysis of the data (Van Gasse et al., 2017). In doing so it can improve articulation by making tacit knowledge within the school community explicit (Cain, 2019) and by encouraging the wealth of knowledge stored in staff bodies to be shared in a meaningful way (Mercer, 2000).

One can find other benefits listed in the literature. Many of these have their roots in 'empowering' staff (Hine and Lavery, 2014, Lebak and Schule, 2014) and creating 'intelligent communities' (Pain, 2012). I list three further benefits below because they form an important motivation for me in involving others directly in the research process. They are, however, inherently different from the arguments listed above as I do not believe they are intrinsic to PAR. This is because, upon reflection, I feel they are the same advantages

of conducting AR by oneself but are enhanced by working with others. In other words, the whole becomes greater than the sum of its parts.

For example, AR narrows the gap between theory and practice by encouraging teachers to construct knowledge themselves (Ripamonti et al., 2015; Hine and Lavery, 2014). This directly impacts student achievement, as teachers develop the courage to make the changes which act in the best interest of the children they teach (Sweetland and Hoy, 2002). In short, conducting AR encapsulates the very essence of what teachers want to get across to their students, namely the pursuit of bettering oneself through knowledge (Anderson et al., 2007; Mills, 2011). Second, teachers are increasingly confronted with ideas that are argued as being 'research based' but are in fact not (Bennett, 2013) due to the increase in pseudoscientific and unproven research in the field of education (Travers, 2017). AR gives teachers greater insight into what can be improved within an institution, especially where practice has stagnated and plateaued over time (Hine and Lavere, 2014; Ripamonti et al., 2015). As a result of engaging critically with research, teachers become lifelong learners (Mills, 2011). Finally, in an educational climate of high expectations, it is argued that it has never been more important to understand how to improve one's own teaching (Noffke and Somekh, 2009). By engaging in AR the teacher is able to reflect critically on how to improve their practice.

I believe these three benefits of AR are compounded when practised collaboratively across an institution. For example, the transformative effect AR has on reflecting on one's own practice (Mertler, 2017; Garcés et al., 2016) has the power of affecting the entire institution when more members of the staff body are involved as it creates a culture shift within the institution of life long learning (Garcés and Granada 2015; Pain, 2012). As a result the school becomes greater than the sum of its parts. It creates an intelligent community (Cain, 2019), or what Stoll and colleagues (2006) call a 'Professional Learning Community'.

As with the advantages, I feel the drawbacks listed in the literature can be equally broken into those which are inherent in PAR and those which are applicable to AR but are heightened due to the number of teachers and participants involved. For example, scholars argue that AR is improved if there is a vested interest in the research (Hine and Lavery, 2014; Anderson, 2007; Griffiths, 1998). If this vested interest is shared by other teachers who have identified a similar issue in their classroom the collective desire to

reach a satisfactory answer and improvement can drive the research forward (Cain, 2019; Anderson et al., 2007). Paradoxically, it is this shared interest which, if left unchecked, can also undo the efforts of research (Waters-Adams, 2006; Hine and Lavery, 2014). Pain and colleagues (2012: 8) summarise this by stating:

> "G*enerally researchers and scientists are presumed to put their feelings to one side when conducting research. But none of us actually do. Especially where we are researching a social or environmental issue that we care about, it is normal to feel emotionally invested in research to some degree. Depending on the topic, strong feelings may be involved and these may affect participants inside and outside the research meetings."*

When there is just one researcher, it is easier to manage the inherent biases that you bring to the research. When several teachers all with vested interests engage in research this becomes much harder to manage, and the difficulty is compounded (the biases for this research will be explored in Sections D and E as well as intervention fidelity). A second issue with AR is that despite its growing popularity, it is still relatively unknown compared to more conventional methods (Mertler and Charles, 2011) making it therefore potentially harder to carry out as there is no 'exact fit' to replicate. As a result the quality of AR is seen to depend on the professional development of the teachers involved (Garcés et al., 2016). Therefore, when working collaboratively, this issue is magnified as the quality of the research becomes dependent on all colleagues involved. In other words, the research becomes as strong as the weakest link within the team. Paradoxically, there is an element of 'the chicken and the egg' as AR can contribute to the professional development of teachers, but only if a certain level of expertise has already been achieved (Ripamonti et al., 2015; Morales, 2016).

Conversely, there are some hurdles which I believe are specific to PAR. Perhaps the most obvious hurdle which needs to be fully understood is that research of this nature is extremely time intensive (Cain, 2019; Hine and Lavery, 2014). Consequently it requires teachers to 'buy-in' to the project as they will each be tasked with implementing the research (Mertler and Charles, 2011). It is undeniable that AR eats into precious free time and this demand, if not fully embraced by the researcher from the outset, can subsequently affect the research negatively (Ripamonti et al., 2015). Either, teachers take

part but realise too late the demand on their time, which can result in corners being cut or the academic rigour being devalued (Waters-Adams, 2006; Morales, 2016). Or, in a work environment where ‘time’ is always disappearing, the added burden of PAR may push some teachers to stop taking part (Morales, 2016).

This drawback of PAR can be mitigated by ensuring any teachers involved volunteer themselves, however, I was conscious that to measure my intervention I wanted to compare classes using a quasi-experimental design. As a result I needed all teachers to be involved, so whilst I received support from colleagues at the beginning, I was unwilling to ask them all to become co-researchers and take on the extra work and responsibility. Furthermore, I was reminded of a piece of research by Gore and Gitlin (2013) who noted that in America and Australia, teachers were overwhelmingly against the use of academic research due to it having little practical application in class. As a keen advocate of AR I was aware that not all teachers would share this same interest. Therefore upon reflection I was conscious that PAR with 15 members of staff might be a step too far.

The deciding factor in terms of whether PAR was the correct approach for me came from Pain and colleagues (2011). In their paper they listed four key aspects of PAR namely: (1) the research is led by its participants, (2) it is a democratic model with regard to creating and owning knowledge, (3) participants are involved in every stage, conversation and decision and finally, (4) its aim is to bring about change in that which is being researched. Apart from the fourth aspect, I was not following the first three aspects strictly enough to allow me to declare that this research was adhering to a PAR approach. Having said this, there were many staff who were interested in being heavily involved in the research. As a result I feel my research sits between AR carried out by myself and PAR as defined by the literature. It is for this reason that I wanted to separate the advantages and disadvantages of PAR into two distinct categories: those which are specifically applicable to PAR and those which can be attributed to AR but are compounded, either positively or negatively, by working collaboratively across the school with different colleagues.

In my effort to tread this fine line between AR and PAR I feel I have gained the benefit of working with colleagues and receiving their advice and guidance without the risk of having asked too much from them. I have, I hope, contributed to empowering other members of staff in their own professional development whilst still allowing me to direct them as participants in implementing the intervention. Finally, and perhaps most importantly,

working with others helped confirm that this particular issue with reading and spelling was observed by other teachers and was something which stakeholders felt ought to be researched.

A.3.4 AR and my thesis

One of the key features of AR which needs a little more explanation is that of cyclical reflections. The cyclical spirals of AR are often attributed to Susman and Evered (1978) who stated that there were five aspects of the cycle: diagnosing, action planning, action taking, evaluating, and specifying learning. In the previous section I quoted Strauss and Corbin (1998: 30) who wrote that research should be perceived as a "circular process, one that involves a lot of going back and forth and around before finally reaching one's goal." Both AR and PAR endeavour to solve issues faced by the research through adopting a cyclical approach whereby processes are revisited and revised in a constant improvement cycle (Hine and Lavery, 2014; Stringer, 2008; Morales, 2016). Macros and colleagues (2009: 191) write:

> *"The central idea in research literature is that through reflection the teacher better understands and extends his/her professional activity and that reflecting on teaching problems will lead to new insights for practice."*

This repetition is critical in improving credibility and rigour within the research (Mertler, 2017). Crucially, however, revisiting an issue is not enough as new understanding is only built through a critical reflection by the researcher. Consequently, it is the cycle of reflections which act as a mechanism to fully understand the problem at hand and effect change (Hine and Lavery, 2014). Reflection becomes *the* driving force behind the research (Anderson et a., 2007) and allows the researcher to see what has been achieved (Pain and colleagues, 2011). Leak and Schule (2014: 5) comment on their own AR project that, "self reflection embedded within the action research process were instrumental […] to critically reflect on [their] practice," and Mertler (2017) builds on this idea by linking reflection to new learning:

> "*[…] reflection results in the acquisition of new knowledge as it pertains to the teaching and learning process.*"

As a result of this importance, there have been many scholars who have tried to visualise this cyclical process in various different models. Often cited examples are: the 'Look, Think and Act' cycle from Stringer (2007), the 'Action Research Spiral' by Backman (2001) or the 'Progressive Problem Solving' by Riel (2008). Essentially, all the models follow the same four steps which are listed by Anderson and colleagues (2007: 20) as:

1. To develop a plan of action to improve what is already happening.
2. To act to implement the plan.
3. To observe the effects of action in the context in which it occurs.
4. To reflect on these effects as a basis for further planning and subsequent action through a succession of cycles.

When carrying out my research I was influenced by a table presented by Kindon and colleagues (2007: 15) which clearly presents the repetitive cycle of 'reflection' and then 'action'. This roughly follows the nine steps recommended by Mertler (2017: 35) of: (1) Identifying and limiting the topic, (2) Gathering information, (3) Reviewing the related literature, (4) Developing a research plan, (5) Implementing the plan and collecting data, (6) Analysing the data, (7) Developing an action plan, (8) Sharing and communicating the results, (9) Reflecting on the process.

In table A.3.4 below I have copied the 'phase' and 'activities' as listed by Kindon with an additional column detailing 'my response'. This structure supported me in guiding me through my EdD. In turn, as you read the response, I hope it clearly signposts where you can find more information about each part of my AR cycle.

Table A.3.4 My AR Cycle

Phase	Activities	My response
Action	Establish relationships and common agenda between stakeholders Collaboratively scope issues and information Agree on time-frame	I initiated interest with staff, and sought support from schools, by presenting my MSc as a mini-pilot study (*find more in A.4*). I also began deciding which colleagues I could work with (*find more in Part C*) and worked with school management to agree logistics (*find more in* C.6).
Reflection	On research design, ethics, power relations, knowledge construction process, representation and accountability	I reflected on my own understanding by engaging in literature reviews (*find more in section* B). I reflected on my research design (*find more in C.4*) and considered ethical implications (*find more in D.1*).
Action	Build relationships Identify roles, responsibilities and ethics procedures Establish a Memorandum of Understanding Collaboratively design research process and tools Discuss and identify desired action outcomes	I built strong relationships with staff (*discussed in part F*). I developed and shared an ethical approach with staff (*find more in D.1*) and shared with colleagues my research aims/questions (*find more in C.2*).
Reflection	On research questions, designs, working relationships and information requirements	I began to work out how I would approach the intervention to find answers to my research questions (*find more in C.2 and section E*).
Action	Work together to implement research process and undertake data collection Enable participation of others Collaboratively analyse information generated Begin planning action together	I implemented the intervention (*find more in part F*). I conducted interviews with pupils and staff to enable further reflection on how to progress (*find more in section E*).
Reflection	On research process Evaluate participation and representation of others Assess need for further research and or various action options	I reflected on the intervention during and after as a whole. I worked out what went well and what could be improved for the second cycle (*find more in section F*).
Action	Plan research informed action which may include feedback to participants and influential others	I disseminated my research (*find more in section E and F*).
Reflection	Evaluate action and process as a whole	I reflected on my research as a whole (*find more in section G*).
Action	Identify options for further participatory research and action with or without academic researchers	(*find more in section G.2)*

(A) 4, MSc to EdD

First written in January 2016, final edit February 2020.

When I joined my current school in 2013 I was exactly half-way through my two-year part-time MSc. In my previous school I had begun researching 'dyslexia screeners' and their impact in primary school settings. I found the topic interesting, mostly because of my own diagnosis of dyslexia which gave the matter a personal interest. It quickly became apparent, however, that whilst this was a useful research topic in my first school - a village state primary in the countryside with a stretched SEN team - it would be less applicable in School A as it was a large high achieving London independent Prep school with a well resourced and staffed SEN department.

Consequently, I focused my attention on how I could improve my literacy teaching for those children who were identified as 'dyslexic'. In the autumn of 2013 I had fortuitously stumbled upon the importance of syllables and the MSc presented itself as a good mechanism to help me unpick current phonic teaching in my school by questioning those practices which had potentially always existed and stagnated (Ripamonti, 2015; Noffke and Somekh, 2009).

I began my final MSc [4] research by focusing on five questions:

1. Does having a good understanding of syllables help spelling?
2. Do children diagnosed with a Specific Learning Difficulty (SLD) in reading and writing find it harder to recognise syllables than children who do not have a difficulty? (Why?)
3. How can children identified with a SLD be supported to improve syllable segmentation?
4. Does improving syllable segmentation improve the confidence of a child with a SLD in spelling polysyllabic words?
5. Does improving syllable segmentation improve the spelling scores of a child with a SLD?

To answer these questions I carried out my research with the Year Four cohort in my school. The cohort comprised nearly 100 boys (although only 87 would complete the pre-

[4] I completed my MSc in Learning and Teaching at Oxford University in 2014.

and post-tests) with varying academic abilities. I adopted a structure similar to that of a quasi-experimental design, adhering to a pre-test-post-test non-equivalent group design. Both comparison groups received the same pre-test syllable screener and had their spelling age data collected through a standardised spelling test. One group (*n = 10*) then received six months of weekly syllable intervention. The other group continued without any additional support in syllable awareness. This allowed the effect of syllable awareness to be measured through the analysis of a post-test syllable screener and an end of year spelling test.

The findings from my research indicated that:

1. Improving syllable awareness could positively impact spelling development. The group who had received six months of focused syllable intervention improved their spelling age by two years on the standardised test. The 10 boys in the intervention group had a mean chronological age of 8.58 years and yet their mean spelling age for the pre-test was 7.38 years. This improved to 9.38 years in the post-test. Even accounting for the six months that had elapsed between the tests it still represented an 18 month improvement.

2. My literature review highlighted the research by Goswami (2002) which indicated that dyslexic children can find the detection of syllables in spoken speech difficult. In Year Four, children who were identified through a Educational Psychologist (Ed Psych. or EP) Report as having a Specific Learning Difficulty (SLD) with reading and spelling did find recognising syllables harder than their peers. The pre-test syllable data showed that children with an Ed Psych Report answered, on average, 16 per cent less questions correctly than their peers.

3. Over the course of the six month intervention children identified with SLDs improved their syllable score. The average score of the syllable group improved from 42 per cent correctly segmented in the pre-test to 58 per cent in the post test. This was achieved by focusing on syllable segmentation skills through a variety of online and kinaesthetic games.

4. When I interviewed the children who took part in the intervention group the general consensus was that having the option of a different segmentation skill made them more

confident to “have a go”. Class teachers also remarked on how the general writing stamina had improved.

5. The research indicated that increasing syllable awareness improved the spelling scores of children with a SLD. I tried to show this through adopting a pre-test/post-test framework with comparison groups. The one group, who received the intervention, improved their syllable score more than the other group. This was, perhaps, to be expected as they had received six months of focused support in syllable segmentation. What was interesting was that the group who received the intervention also improved their spelling age by two years. The other group, on the other hand, made roughly six months progress in their spelling, which was consistent with the six months which had elapsed between the tests.

My MSc did have several limitations:

- First, my MSc research was limited by the length of the intervention period (six months).
- Second, my sample size was small, centring around an intervention group for 10 boys identified by an external education psychologist as having dyslexia.
- Third, whilst my research indicated that the boys identified as being dyslexic found syllable recognition difficult, I did not clarify why this might be the case.
- Fourth, I focused only on whether children with SLDs improved their spelling scores; could it help all children?
- Fifth, why spelling? Could the intervention benefit other areas of their literacy development; perhaps reading?

Reflecting on this MSc encouraged me to improve my research design and explore the matter further. In this regard it formed a formative evaluation upon which I sought ways to improve the research; an important aspect of the AR process (Johnson, 2008; Mertler, 2017). The conclusions I drew from my research gave me the motivation to keep going. The significant limitations of the MSc gave me a starting point to reflect with colleagues and stakeholders as to how this research could be improved. I initially did this by trying to better understand how reading and spelling developed in young children and the impact which syllables might have. Consequently, the outcomes of the MSc marked the beginning of this AR for two main reasons:

- First, I used the findings to persuade stakeholders, especially senior leadership in both schools, why it might be beneficial to engage in further research.

- Second, through disseminating my findings with colleagues, I used the MSc research as a platform to build relationships which were crucial for my AR as part of my EdD.

I know that the MSc will have influenced how I approached the EdD, which is why in the previous section I presented my conceptualisation of my EdD journey which included a 'blue brick' representing the experiences formed before my doctorate began (Griffiths, 1998). Consequently, I felt it was prudent and necessary to include this summary of my MSc research at the beginning of this EdD thesis to allow the reader to better understand where this current thesis originated.

Part B - Literature Reviews

(B) 1, Why these questions?

First written in April 2019, final edit February 2021.

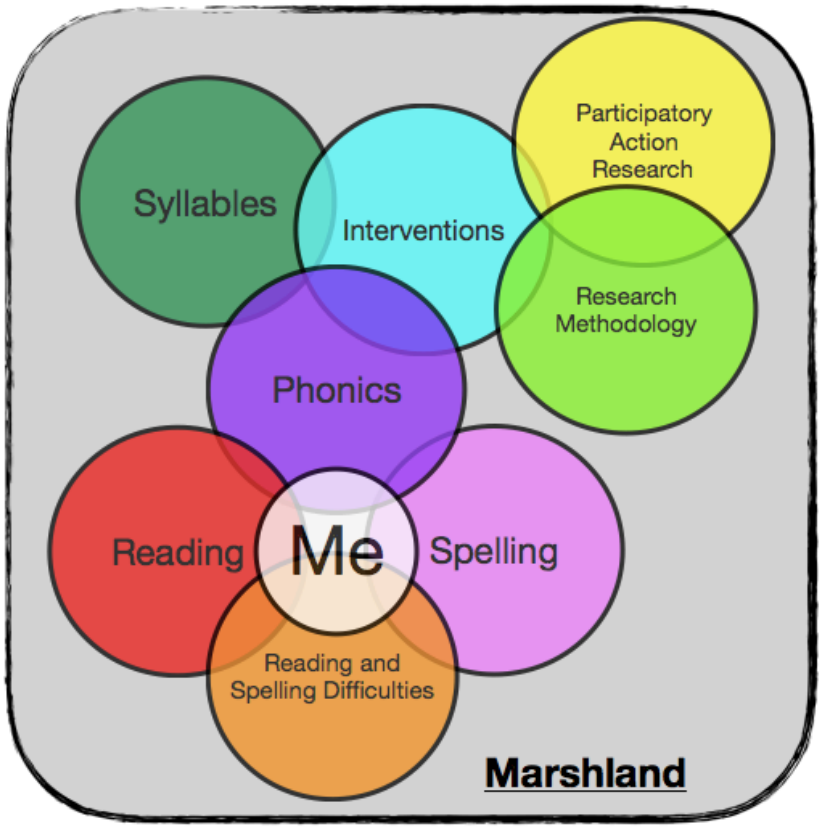
B.1.1 Literature review: the start

In 2016 I attended a conference led by Julia Flutter who spoke about the 'impact' of research using an analogy of 'ponds'. In her parallelism, researchers stand at the edge of a theoretical pond, for example '*The Reading Pond*', and metaphorically throw their findings into the centre. As a result, their research can either make a ripple or a splash. With regard to the literature I was going to review, I found it helpful to have one eye on 'impact'. Whilst I will return to this issue later in section G, it was important for me to understand the role literature would play in the AR cycle to achieve impact.

As Tekin and Kotaman (2013) note, the aim of reviewing the literature is to investigate whether similar situations/solutions exist and to deepen understanding. An important aspect of the AR cycle is the 'advancement of knowledge' (Morales, 2016; Chevalier and Buckles, 2019), and by thinking about how I wanted to achieve this I was able to plan where this research would need to position itself. In doing so, I was then able to identify the areas of literature I wanted to engage with.

Positioning my research was not as easy as simply deciding which 'pond' I wanted to stand next to. In fact, I found the concept of standing by one pond inherently limiting. This was because I felt my area of interest could not be compartmentalised into one aspect of education. Whilst 'reading', 'spelling' and 'difficulties with the aforementioned' could be housed under the umbrella of 'early literacy development', I was also interested in '*interventions*' with a '*phonic*' focus on '*syllables*'. Consequently, despite the analogy of the pond resonating with me, I realised it did not work in its current form. As a result I deconstructed Flutter's (2016) pond analogy and conceived it as a 'Marshland' which I have included in figure B.1.1 below:

Figure B.1.1 Positioning Myself Within the Marshland



When I discussed this 'marshland' with colleagues, both in school and on the doctoral programme, the most common response was: *why is this visualisation even necessary*? For me the visualisation had the following benefits:

1. First and foremost, it helped me position the research. By understanding where I perceived its potential impact, I was better placed to narrow my efforts.

2. The visualisation clarified what literature I needed to review. By identifying the fields of: (1) Reading, (2) Spelling, (3) Difficulties with Reading and Spelling, (4) Phonics, (5) Syllables, (6) Interventions, (7) Research Methodology and (8) Action Research I had a clearer understanding of what needed to be included in the literature review. In this regard, numbers 1-5 are addressed in the literature review with numbers 6-8 addressed in other sections. This also ties back to the idea of a 'play within a play' and portfolio approach where numbers 1-6 pertain to the forming of the intervention, whilst

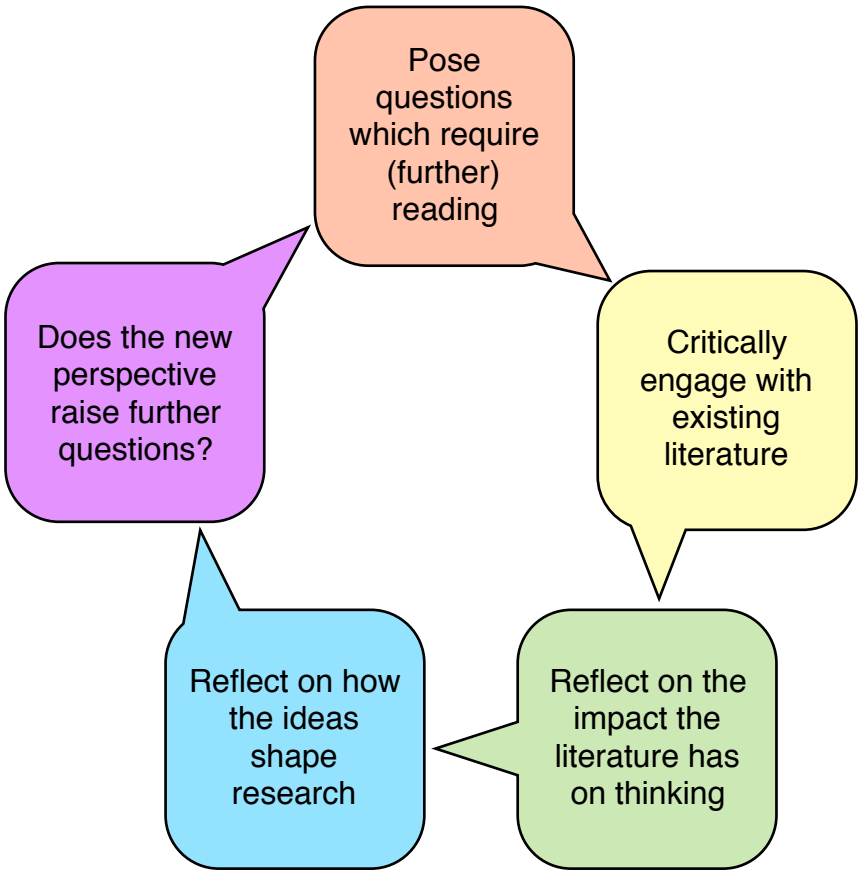
7 and 8 lean more towards AR.

3. Crucially, the visualisation reminded me that my literature review stretched across different fields. I specifically wanted this research to break away from a rigid compartmentalisation of standing next to individual ponds. Therefore, this 'marshland' was more than just reminding me of the way topics interlink, it also served as a reminder of how to structure the literature as a whole to ensure sections remained interwoven.

B.1.2 Literature review: the how

As mentioned, this literature review will focus on: (1) Reading, (2) Spelling, (3) Difficulties with Reading and Spelling, (4) Phonics, (5) Syllables. I had an initial insight into some of the literature surrounding early literacy development and syllables as part of my reading for my MSc. By following an AR approach I used the MSc as a starting point to reflect on where I needed to significantly develop my understanding and how I could go about it. I used https://eric.ed.gov as a starting point and began reading peer-reviewed empirical research from the last five years. I followed the advice of Mertler (2017) who suggests that one can feel relatively confident about having read enough once one begins to read the same cited research and scholars. When this happened I engaged in a reflective cycle which I have included in figure B.1.2 below.

Figure B.1.2 The Process of Literature Reviews



I engaged in this cycle throughout the six years and section B was the last section I completed in an effort to ensure it was completely up to date. In the last twelve months there have been significant reworks and rebalances to get to this point. There were numerous sections which I wanted to include but could not because I had given myself a finite number of words for this section. The two parts to this literature review are:

- The Landscape of Reading and Spelling Research

- The Importance of Syllable Awareness;
  (1) How might improved syllable awareness benefit reading and spelling,
  (2) What is the link between syllable awareness and specific learning difficulties?

As with all sections, each of the literature reviews will begin with a '*preamble*'. My hope is that these forewords help to signpost, as much as possible, how these sections fit together and where the literature has shaped my research. All three sections can, to a certain

extent, be viewed as the final version of numerous redrafts. My interest in these areas of research began almost a decade ago and consequently some ideas have remained constant throughout that time whilst many new ideas have encased and intertwined themselves. I have endeavoured to highlight where this happens as much as possible throughout. Finally, my understanding of the words 'final version' is that it is almost always *not* the final version. Similarly, I do not, for one moment, assume these reviews will remain unchanged in years to come (and in fact subsection G.2 will identify areas of further research including literature which will need to be addressed next).

(B) 2, The Landscape of Reading and Spelling

First written in March 2016, final edit October 2020.

B.2.1 Preamble

How we teach young children to read and spell remains just as contentious now as it has ever been. My area of interest and research focus has always been on a phonic intervention with the aim of improving reading and spelling attainment for young children. Consequently, understanding how children learn to read and spell has always been of central importance for me.

In its current format, this section, titled 'The Landscape of Reading and Spelling', was a late addition to this thesis. In 2016 I presented two distinctly separate articles for my Registration Viva titled; 'How do children learn to read (could we do more)?' and 'How do children learn to spell?' Originally, for this final thesis, I had wanted to divide these two papers even further into three: (1) 'The Reading Wars', to conceptualise where this thesis sat with regard to the wider breadth of literature, (2) 'How Children Learn to Read' and finally, (3) 'How Children Learn to Spell'. Through the various drafting cycles it was agreed that this was not the most advisable option with regard to word count, relevance and overall structural coherence of the thesis. Consequently, I have endeavoured to include everything in this one section to give the reader a greater understanding of where this research sits in the wealth of literature surrounding reading and spelling. This section has been redrafted several times. I have tried, whenever possible, to say whether my understanding has changed over the years. In essence, my views on reading and spelling have remained fairly constant, especially with regard to the importance of a more balanced phonic teaching programme. My understanding of how this fits in with wider reading and spelling developmental theories has, however, changed over the years, and this is something which I hope will become clear when reading this redrafted literature review.

B.2.2 Introduction

> *"Nothing is more important in education than ensuring that every child can read well. Pupils who can read are overwhelmingly more likely to succeed at school, achieve good qualifications, and subsequently enjoy a fulfilling and rewarding career. Those who cannot will find themselves at constant disadvantage."*
>
> (DfE, 2015)

When it comes to reading and spelling, I believe there are two truisms. The first is summarised by the above quotation which reminds us how important it is for schools to get early literacy development 'right' for the young children in their care. One would be hard pressed to find more important skills for children to master during their time at primary school than those of reading and spelling. It is, as the quotation suggests, much more than simply giving children skills which they will use every day for the rest of their lives (although this would be a very worthy cause in itself!). Mastering reading and spelling enables children to thrive, engage with the wider world around them and make use of the innumerable opportunities at their disposal.

The second truism is that not all children will learn to read and spell at the same time or at the same pace, or with the same ease. MacLachlan and colleagues (2013: 41) rightly point out that, "We are wired through evolution to walk and talk, but someone has to teach us to read and write." The English language can feel irregular, illogical and incomprehensible. It is believed that only 56 per cent of all words can be decoded with phonics (Crystal, 2000) and unlike Finnish, Italian or Spanish with their shallow orthography, English is 'deep' and 'opaque' making any phoneme letter correspondences far more complicated (Devonshire et al., 2013; Ehri and Nunes, 2005).

Despite these 'irregularities' most children in England will learn to read and spell (Denton et al., 2006; DfE, 2015[5]). This literature review therefore will endeavour to explore how this happens, but with a view on how we can continue to improve our practice for those who find it difficult to learn to read and spell. I will begin by exploring some of the various definitions for reading and spelling. Like most literature reviews, this is not only a natural

[5] See DfE, 2015. In 2012 74 per cent of all children nationally met the government's expectation of reading development.

place to start but understanding the nuances within the definitions serves a further purpose of knowing where one sits in the spectrum of reading and spelling theories.

Second, this review will explore some of the differing theories of reading and spelling development and how they compare with what I have seen in my own practice. I conclude by offering the reader my own views on reading and spelling development, and introduce a 'Mini-Milestone' which I believe is critical in early literacy development. Using this 'Mini-Milestone' I will explore some of the phonics debate and why some children find this developmental process difficult.

Finally, the theories of reading and spelling development raise questions of context, comprehension and preschool experience. Of course there are many other factors which play an important role in literacy development, but it must be noted that I am unable to explore all of these due to varying constraints. Nevertheless, my understanding of context, comprehension and preschool experience has changed considerably since undertaking this doctorate, therefore making it a worthy section to include.

B.2.3 Definitions

Defining 'reading' and 'spelling' is important not only because it offers a foundation upon which to outline the various theories. The definition is intrinsically important in determining the parameters of the literature review itself. For example the The Cambridge Dictionary (read, 2020) defines reading as:

> "*To look at words or symbols and understand what they mean.*"

However, this definition omits *how* the reader reads which is obviously an important aspects of reading which should be included in the definition. Jolliffe (2019) writes that there are two fundamental aspects of reading: first, the ability to decode printed words and match them to their corresponding phonemes and second, to then be able to store the words in our personal lexicon so that we can understand. With that in mind, my working definition for reading for this thesis is as follows:

> *"[Reading is] the process whereby print is decoded with the intention of deriving meaning and understanding."*

If we unpick this definition, two parts emerge. First, the intention behind reading is to comprehend (Nicolson, 2017) which ties in with constructivist thinking regarding the role context plays. The second part of the definition is that the act of reading requires decoding skills. These are crucial features which will be explored throughout this review, both in terms of how this process develops towards fluency and the debate surrounding which decoding strategy, if any, is best.

According to Allott (2019) successful spelling has four prerequisites: knowing the alphabetic code (graphemes and phonemes), understanding the complexities of the writing system, knowing how to make plausible attempts at unknown words and the ability to commit new words to memory. My definition of spelling draws upon this, as well as being influenced by the '*Three perspectives on spelling*' by Pollo and colleagues (2008). I go on to explore both of these pieces of work in greater depth later, but for now my working definition of spelling is:

> *"[Spelling is] the process whereby the phoneme, syllable or morpheme chunks of a word are consciously segmented and then written down using grapheme correspondences with the intention of conveying information."*

Finally, it has always surprised me how over the years I have seen and heard key terminology used incorrectly, be it in literature, or by presenters at conferences, or by teaching professionals. Even now at the time of writing (2020), the Education Endowment Foundation (EEF) (2018a) uses the terms 'phonics' and 'phonemes' incorrectly by treating them synonymously. Whilst Engen and Høien (2002) note that this is often the case, to try and avoid making the same mistake I have defined all key words in the glossary of terms.

B.2.4 Reading and spelling development theories [6]

Most scholars regard reading and spelling as developing through phases (Ehri, 2014; Pollo et al., 2008; Goswami, 2006; Wheldall, 2006). Developmental models of reading date back to the 1970s, with LaBerge and Samuels (1974) promoting the importance of 'automaticity', and Stanovich (1980) with his 'Compensatory Processing Model'. My first encounter with language developing through phases was when I read the work by Ehri as part of my PGCE. My understanding of her early (1985; 1987), and later (2005; 2009; 2014; 2015) work, was that it prompted others to propose their own version of reading and spelling development which similarly progressed through phases (Frith, 1985; Lindamood et al., 1997; Samuels, 2003).

In the same year that Ehri (1985) published her article, Frith (1985) also outlined three phases of reading development. She believed that children progressed from a 'Logographic Phase', to an 'Alphabetic Phase', to an 'Orthographic Phase'. Similarly, Samuels (2003) also proposed that there were three stages to reading development: 'Non-Accurate', 'Accurate (but not automatic)', and 'Accurate (and automatic)'. Whilst Samuels refers to the name of each phase differently, the categorisation remains almost identical to Frith. For both Frith and Samuels, phase one represents the child as a non-reader due to not having adequate phoneme instruction. In phase two children learn to read as they are introduced to phonics, and the final phase categorises the fluent reader.

Ehri (2014), on the other hand, suggests that there are four phases of reading development. The names of these phases refer to the child's proficiency in building phoneme-grapheme connections. Whilst three of these stages are similar to those of Frith and Samuels, Ehri divides the second stage into 'Partial-' and 'Full- Alphabetic Phase' and it is the division into the 'Partial-' and 'Full- Alphabetic Phases' which makes Ehri's model important for understanding reading and spelling development. Ehri's (2014) four phases are: 'Pre-Alphabetic', 'Partial-Alphabetic', 'Full-Alphabetic', and 'Consolidated Alphabetic'.

[6] This section of the literature review has, in my opinion, benefited the most from the constant redrafting process. This is because previously, reading and spelling were separate literature reviews and therefore separate sections on reading and spelling theories. Perhaps unsurprisingly, I found that these theories often overlapped and therefore discussing them here together not only makes sense but also helps build a much clearer picture of how they intersect.

The underlying similarity in the above theories of reading development is that the parameters of each ‘phase’ are defined by the phonological capabilities of the child. This is the same assumption made in the ‘Phonological Perspective of Spelling Development’ (Pollo et al., 2008). Ehri (1987) originally proposed three phases of spelling development but later expanded it to four to match her reading theories (2014). Ellis (1994) tried to explain spelling development in three stages, whilst Bowtell and colleagues (2014) expanded to five phases based on the Primary National Strategy (2007) and Letters and Sounds (DfE, 2007). My understanding of all these versions is that they are loosely based off the seminal work carried out by Gentry back in 1982 where he categorised the five phases as; ‘Pre-Communicative’, ‘Semi-Phonetic’, ‘Phonetic’, ‘Transitional’ and ‘Complete’.

I could have used any of the above theories but I was most interested in those of Ehri and Gentry. This was partly due to the number of times their work had been cited (Ehri, 2009, cited 478 times and Gentry, 1982 cited 641 times) but also how prevalent their theories remain in current literature (see Treiman and Wolter, 2020). The theories of Gentry and Ehri also fitted easily together therefore I will now discuss early literacy development by combining both theoretical models:

1. Ehri defines the first reading phase as ‘Pre-Alphabetic’ to describe the period between birth and alphabet instruction (Ehri, 2005). Children are not aware of phonemes and are therefore unable to read words. Gentry (1982) describes the first spelling phase as ‘Pre-Communicative’. Similar to reading, this phase of spelling development categorises the child who engages in mark making to reflect alphabetic principles, albeit with no awareness of grapheme-phoneme correspondence.

   My own experience of teaching young children (and their pre-school siblings) is that whilst it is necessary to define the first phase as the period before alphabetic instruction, one must tread carefully when suggesting this phase lacks all awareness on the part of the child. Defining the phase as ‘Pre-Alphabetic’ or ‘Pre-Communicative’ suggests that children are unable to engage with the experiences presented to them. This is not always the case. Pressley (2002) notes that many preschool children can read the signs for ‘McDonalds’ and ‘Burger King’ before any letter sound correspondences have been taught. Gough and colleagues (1992) coined this as ‘Selective-’ or ‘Logographic Association‘ and whilst Ehri and Gentry do not directly mention ‘Logographic

Awareness', Frith (1985) named her first phase as the 'Logographic Phase'.

2. Once children are made aware of the alphabet and begin to understand that letters correspond to sounds they are able to pass into the 'Partial-Alphabetic' phase of reading. The word 'partial' refers to the idea that children will have some difficulty in distinguishing all the phonemes in a given word (Ehri, 2005). For Gentry (1982: 194), the second phase in spelling development is 'Semi-Phonetic' and is characterised by a developing awareness that letters correspond to sounds. Gentry gives the examples "RUDF [Are you deaf], GABJ [garbage], TLEFNMBER [telephone number]." Like reading, this indicates that in the second phase the child is beginning to learn the importance of the alphabetic principles.

   Pollo and colleagues (2008) write that in the 'Semi-Phonetic' spelling phase children spell using an initial letter naming strategy. In short, children use the names of letters to represent words, for example 'R U' for 'are you'. Treiman and Wolter (2020) have carried out research in this field and shown that children spell the initial phoneme in a word correctly if it links with the letter name. Nevertheless, I would argue that synthetic phonic schemes used by schools today (Read Write Inc, Letters and Sounds etc.) do not use letter names to teach graphemes but focus instead on phonemic pronunciation, in this case [ʌ]. Consequently, this phase and 'sound' spelling would still exist, but 'R U" would more likely be presented as 'R EW' [uː] (Ellefson et al., 2009).

3. Interestingly, Gentry (1982) notes that children may have a short stint in the second 'Semi-Phonetic' spelling phase due to the 'intensity and quality' of teaching. In other words, as soon as children are taught phonemes they progress quickly to the next phase. Similarly, Ehri (2005) states that as soon as children improve their phoneme awareness they move into the 'Full-Alphabetic' phase. It is at this stage that children begin to commit to memory the connections between the spelling of the word, its pronunciation and its meaning. As these connections become embedded in memory they are able to recognise more words by sight and develop greater automaticity (Engen and Høien, 2002). This ability to read some words by sight whilst having to decode others links with original research by Coltheart (1978) who suggests that the mind operates a parallel coding system. In this system familiar words are recognised through a direct visual pathway, whilst less common words require an indirect decoding route.

Gentry (1982) categorises the ‘Phonetic Phase’ with the example: “TLEFN [telephone] becomes TALA FON [telephone]”. The child focuses on grapheme-phoneme correspondence because he or she is taught phonological word segmentation skills, and therefore spellings become increasingly phonetically plausible. Treiman and Wolter (2020) write that despite still being incorrect, the improvement in terms of plausibility is an important step in the developmental process. As someone interested in syllables, this phase has always seemed very important because it was the first example I could find of syllabic awareness playing an important role. The additional vowels in the examples do not just improve the phonetic accuracy but also represent an awareness of syllabic structure. The addition of the vowels in ‘telephone’ changes the word from being phonetically and syllabically incorrect (TLEFN = 2 syllables) to syllabically accurate and phonetically plausible (TALAFON = 3 syllables).

4. The four phases of reading development according to Ehri, versus the five phases of spelling development by Gentry, will naturally create one spare phase where spelling and reading do not match seamlessly. I believe this occurs between the penultimate and final phase. In this gap, I believe one could position the fourth phase of spelling development which is aptly named the ‘Transitional’ phase. Children in this phase have an awareness of English orthography. Ellis (1994) points out that in this phase spellers can be seen to move from a phonemic understanding of words to appreciating the morphological and orthographic structures. It is also the phase where errors as seen in the ‘Phonetic Phase’ are ironed out. For example, vowel omissions such as ‘kok’ for ‘Coke’ and consonant irregularities like ‘Pesi’ instead of ‘Pepsi’ are reduced (Read and Treiman, 2012).

5. The final reading phase is referred to as the ‘Consolidated Alphabetic’ phase. It categorises children who are able to recognise ‘recurring syllabic and morphemic units’ (Ehri, 2014). This phase is similar to the *‘Orthographic Phase’* (Frith 1985) and the *‘Accurate (and automatic phase)’* (Samuels 2003). The recognition of larger chunks in language is crucial in understanding the full concept of words (Mesmer and Williams, 2015). Although there is a limited number of studies exploring the relationship between syllable awareness and word concept development (Flanigan, 2007), multisyllabic control is believed to be important in literacy development as a way of controlling reading (Smith, 2012). For example, it is important for a child to understand that there will be two syllables to ‘baker’ when they read it (Mesmer and Williams, 2015).

Consequently, I believe syllabic awareness becomes an important feature in the final phase for two main reasons. First, scholars argue that it seems logical that as children tackle multisyllabic words, they need multisyllabic tools (Tarraran, 2018; Duncan and Seymour, 2003). Second, at this stage more words are stored in memory. Ehri (2014) explains this using the word *comfort* [kʌmfət], which can be broken down into six phonemes (c.o.m.f.or.t) or two syllables (com/fort). Quite simply, having fewer connections makes it easier to store the word in memory and recall it by sight.

The final phase of spelling is labelled 'Correct Spelling' and, similar to reading, children are expected to have a firm understanding of English orthography with the rules firmly established. They are able to identify and spell prefixes, suffixes and compound words correctly and can distinguish homonyms. Correct spellers can be identified by their ability to think of alternative spellings and then recognise which version of the word is spelt correctly. Ehri (2005) notes that approaching spelling syllabically also helps learners to remember chunks of information in memory.

Reading through all the phases of reading and spelling development can be a little confusing and so I have endeavoured to place them into table B.2.4.1 below. I have also tried to define the parameters between phases more clearly. One of the criticisms of Ehri's model is that she did not state how progression from one phase to the next was achieved (Beech, 2005). I have endeavoured to clarify the boundaries by relating them to school years:

Table B.2.4.1 Timeline of Reading and Spelling Proficiency

Timeline of reading and spelling proficiency in English primary schools								
Relation to School Year	Birth to Reception	→	Reception (and Nursery)	→	Year One		→	Year Two
Relation to Letters and Sounds (DfE, 2007)	*Good parenting may expose their child to Phase 1*	→	Phases 1, 2, 3 and 4 (Depending on school setting)	→	Phases 3, 4 and 5 (This would be the minimum required to pass the Government Phonics Screener)		→	Phase 6
Spelling Development According to Gentry (1982)	Pre-Communicative Phase	→	Semi-Phonetic Phase	→	Phonetic Phase	→ Transitional Phase	→	Complete Phase
Reading Development According to Ehri (2005)	Pre-Alphabetic Phase	→	Partial-Alphabetic Phase	→	Full-Alphabetic Phase		→	Consolidated Alphabetic Phase
Reading Development According to Frith (1985)	Logographic Phase	→	Alphabetic Phase				→	Orthographic Phase
Reading Development According to Samuels (2003)	Non-Accurate Phase	→	Accurate but not Automatic Phase				→	Accurate and Automatic Phase

Whilst it is possible to present theories of reading and spelling development together, in reality it rarely happens that neatly. Read and Treiman (2012) rightly point out that developmental theories are intrinsically flawed by the inescapable reality that there is a great deal of fluctuation in the speed with which children develop. This is both in their overall development as well as the relationship between spelling and reading. I myself have often observed a discrepancy between what children can read and what they can spell; in other words, children are rarely in the same reading and spelling phase. Goswami and Bryant (1990: 148) comment on this:

> "*It is still not clear why children are so willing to break up words into phonemes when they write, and yet are so reluctant to think in terms of phonemes when they read. The most dramatic demonstration of this separation is the fact that young children often cannot read some words that they know how to spell and also fail to spell some words which they can read*."

My own experience is that children's spelling often lingers behind reading ability in that their spelling is always playing 'catch-up' to their reading. This is especially the case when it comes to the final phase where you can have competent readers and yet spelling

remains a challenge for them. Ehri (2005) herself notes that when reading, words are always spelt in the same way but when spelling phonemes the difficulty is that they can be represented in many different graphemes. I do, however, concede that emergent spelling may precede emergent reading. This is because emergent spelling encourages children to see the value in printed words, which has been argued as the first step in literacy development (Mehta et al., 2018; Gentry and Gillet, 1993).

When analysing the final phase in greater detail, it becomes clear that Ehri (2005), Frith (1985) and Samuels (2003) all believe that reading fluency is achieved in the final phase. This is when words are no longer decoded, instead they are read more efficiently by sight because this is the most efficient way to read (Ehri, 2005). It must, however, be noted that this importance placed on sight reading is not shared by all. For example, establishing sight vocabulary is an important aspect of Ehri's theory of reading development whilst Frith, on the other hand, sees the development of reading more holistically and consequently does not focus on it to the same extent. Furthermore, Ehri perceives the development of sight vocabulary to stem from connections made between graphemes and phonemes whilst Frith believes sight vocabulary to be independent from phoneme-grapheme connections, focusing instead on orthography.

It is, however, worth stressing that not all scholars believe reading fluency can be defined by sight vocabulary. For Lindamood and colleagues (1997), becoming a fluent reader is dependent on their independence when they read, which hinges on the ability to self-correct. Children must be able to correct any mistakes with decoding to ensure they have understood the text as intended. Conversely, if you need the assistance of another person to help you read then you are not independent and therefore not a fluent reader.

This is where one's definition of reading becomes critical: reading is the combination of both decoding and understanding. It is, therefore, prudent to look beyond just the phase approach of literacy development and consider the principles underpinning Lindamood's work. Whilst her model of reading development is not entirely different from that of Ehri, she does point out that to self correct efficiently you must be competent at "monitoring of sensory feedback through comparator function" (Lindamood, 1997: 216). The example given is reading the word 'stream' [striːm] as 'steam' [stiːm]. If you miss out the /r/ it is the discrepancy between what you pronounced and what you read that enables you to correct yourself. This ability helps you to become an independent reader but relies on a

comprehensive understanding of phonic awareness. Consequently, whilst phonemic awareness remains undeniably important in being able to identify where a word is incorrectly decoded, Lindamood emphasises the link between fluency and independence in a way the other theories of literacy development fail to address.

My own understanding of fluency is somewhere between the two: I wholeheartedly believe independence is critical if a child is to be considered fluent, whilst also accepting that being able to self-correct cannot, by itself, be the definition of fluency. For example, just because children have learnt to correct misread words does not make them fluent if they are still decoding every phoneme in every word. There has to be a level of automaticity which can only be achieved through sight vocabulary. I believe the same argument can be applied to spelling. Share (2004) notes that spellers retain words in memory similar to that of reading. Competent spellers do not decode each new word but subconsciously apply the correct graphemes when learnt (Allott, 2019). Therefore, similar to reading, to be a fluent speller requires more than just being able to recall words quickly from memory; it is also about being able to self-correct spelling mistakes.

My experience as a Year One and Early Years teacher is that even in the ‘Full-Alphabetic’ phase there exists a noticeable divide within the class. Some children have good phonemic skills but continue to misread words. This is either because some guess when reading or they replace the word for one they already know. Either way, children in the ‘Full-Alphabetic’ phase do not all self-correct mistakes, but it is within this phase that it begins. Whilst these observations are perhaps unsurprising, they have led me to believe that the movement within the ‘Full-Alphabetic’ phase is possibly the defining movement in reading and spelling development - the ‘Mini-Milestone’ before fluency. This idea is influenced by the concept of being able to *self-correct* (Lindamood, 1997), although I would like to build on this by arguing that a comprehensive understanding of phonics provides a foundation from which all words (familiar, unfamiliar and pseudo) can be read and spelt without requiring help. A simple example of this is an adult reading or spelling the name of an obscure village on a road map. The adult is able to read the word, despite never having seen the word before, because they are able to use their phonemic, syllabic and orthographic understanding of language. This skill can begin when a child progresses into the ‘Full-Alphabetic’ phase. This is similar to spelling an obscure village name. Again, this can only happen when children enter the ‘Phonemic‘ phase and are able to use their phonemic, syllabic and orthographic understanding of language. My observation of this

within my own classes can be defined as a mindset shift from being a *dependent* reader and speller to a child becoming a *self-reliant* reader and speller. This is supported by Stuart (2006) who notes that developing readers eventually become 'self-sustaining'.

Whilst becoming '*self-reliant'* does not directly fit with a phased approach to reading or spelling, I have tried to show where I think this development takes place in table B.2.4.2 below. The blue dashed line reflects my argument that this is the moment when the 'Mini-Milestone' in reading and spelling development occurs. This table is based on the same table as B.2.4.1 above, but I have also included how I believe Lindamood, and my own views, fit with that which has already been discussed.

Table B.2.4.2 'Mini-Milestone'

Timeline of reading and spelling proficiency in English primary schools									
Relation to School Year	Birth to Reception	→	Reception (and Nursery)	→	Year One			→	Year Two
Relation to Letters and Sounds (DfE, 2007)	*Good parenting may expose their child to Phase 1*	→	Phases 1, 2, 3 and 4 (Depending on school setting)	→	Phases 3, 4 and 5 (This would be the minimum required to pass the Government Phonics Screener)			→	Phase 6
Spelling Development According to Gentry (1982)	Pre-Communicative Phase	→	Semi-Phonetic Phase	→	Phonetic Phase	→	Transitional Phase	→	Complete Phase
Reading Development According to Ehri (2005)	Pre-Alphabetic Phase	→	Partial-Alphabetic Phase	→	Full-Alphabetic Phase			→	Consolidated Alphabetic Phase
Reading Development According to Frith (1985)	Logographic Phase	→	Alphabetic Phase					→	Orthographic Phase
Reading Development According to Samuels (2003)	Non-Accurate Phase	→	Accurate but not Automatic Phase					→	Accurate and Automatic Phase
Process Towards Reading Independence According to Lindamood et al., (1997)	Developing Phonological Understanding				Developed Phonological Understanding	→	Monitoring of Sensory Feedback	→	Self Correct Mistakes and therefore Independent
Classroom Observation	Dependent Reader and Speller					→	(Increasingly) Self-Sufficient Reader and Speller		

Mini Milestone

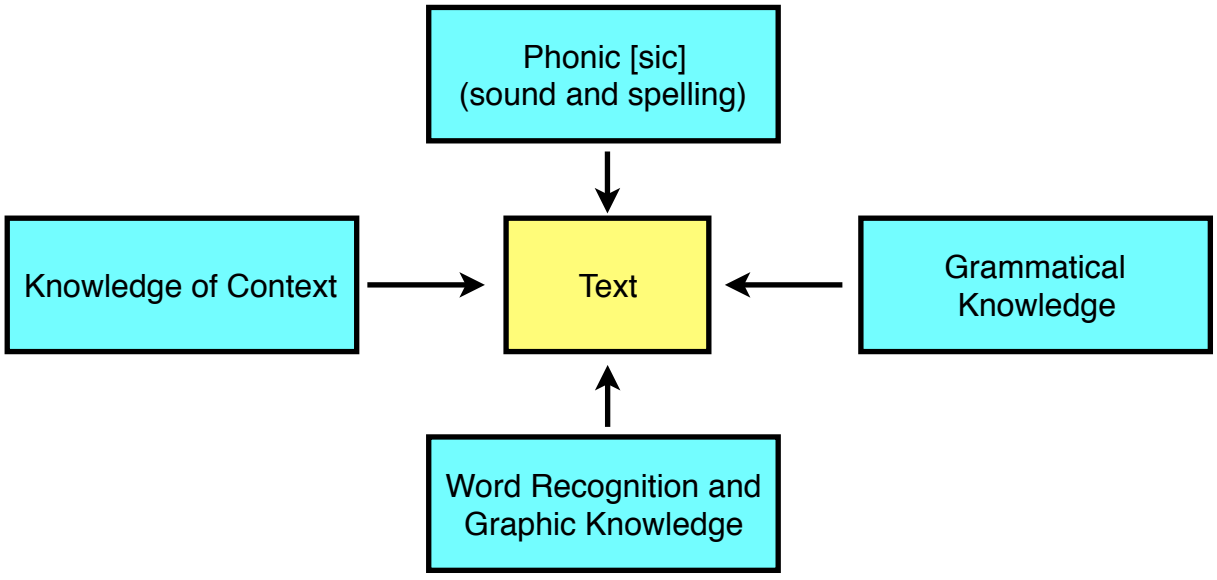
The redrafting process of this section has impacted on this table. Originally, when I combined all the models, I argued that the concept of *self-correcting*, and being a *self-sufficient* reader and speller, could only be seen to begin at the start of the 'Full-Alphabetic' phase. I have now shifted this point half way through the phase because when I included Lindamood's model of development I realised that the 'Mini-Milestone' is not achieved as soon as the child begins the 'Full-Alphabetic' phase, it is something which develops throughout that phase. This is because the monitoring of sensory feedback requires

experience and consistent exposure to words; it cannot be attained instantly. With regard to spelling, the 'Mini-Milestone' fits in perfectly with the 'Transitional' phase which I believe is crucial in building greater independence for the child. This is partly because the speller can be seen to move from a phonemic understanding of words to appreciating the morphological and orthographic structures.

B.2.5 Context, comprehension and preschool experience

So far this section has defined reading and spelling and explored how scholars have explained the respective development. I have offered my own ideas regarding how reading and spelling progresses through the use of the 'Mini-Milestone'. In doing so, I began to touch upon the idea of 'fluency' and 'self-reliance' which raises issues of context and preschool experience [7]. Context plays a significant role in both reading and spelling development (Mesmer and Williams, 2015; Flanigan, 2007). This can be visualised in many different ways, one being the 'Searchlight Model' from Clay and Cazden (1990) which I have included in Figure B.2.5 below:

Figure B.2.5 The Searchlight Model for Reading



[7] I must acknowledge that there are simply too many aspects of reading and spelling development to mention them all. Omitting these is not a reflection of their importance but rather an act of necessity and congruence for this particular research.

In this model successful reading is dependent on phonics, grammar, word recognition and context. Over the years, my relationship with this model, especially the dominance of each box, has shifted and, in turn, shaped my research design. At the beginning of my research I focused most of my attention on phonics, both as a teacher and researcher. I found myself influenced by phonological perspectives of reading and spelling development and my own teaching practice which centred around a phonemic approach to teaching reading and spelling. Ellis and Moss (2014: 242) note that,

> "*The training document to support Ofsted inspections of the new reading curriculum mentions 'phonics' 130 times but comprehension just 9 times (Oftsed, 2011)*."

Consequently, this perceived importance of phonics is perhaps unsurprising. Nevertheless, the more I researched reading and spelling development, the more I was drawn towards the importance of context, comprehension and especially the underlying importance of preschool experience. I now look upon the searchlight model with a little more balance; although the weight of each box will ultimately depend on one's definition, I believe context has a significant role to play. Whilst the developmental theories of Ehri and Gentry have little mention of context, for constructivists the ability to use context effectively becomes a defining skill (Weaver, 1994). Cambourne (2003: 27) summarises this well with the following:

> "*The experiences and contexts in which learning to read is embedded will be critical to each learner's understanding of, and ability to use, reading*."

One of the ways context aids literacy development is through its relationship with comprehension. The aim of reading is to comprehend (Nicolson, 2017) and context not only aids comprehension, it is also able to improve it. The argument made by constructivists is that if children use context correctly, they are able to comprehend text much better than if they approach the text solely at phoneme level (Weaver, 1994; Cambourne, 2003). Nearly forty years ago, Oakhill and Garnham (1988: 21) gave the following example which emphasises the importance of context:

> *"Jane was invited to Jack's birthday party. She wondered if he would like a kite. She went to her room and shook her piggy bank. It made no sound."*

The child understands 'it made no sound' due to the understanding of a piggy bank being an object in which coins could be placed. Furthermore, this also exemplifies the importance of cultural understanding that the child knew that at birthdays people bring gifts (Purcell-Gates, 2002). Similarly, Weaver (1994) introduced 'Schema Theory'. She argued that we constantly rely on prior knowledge to help comprehension. For example when you enter a restaurant (for example: McDonalds, Pizza Hut or Nandos), your prior knowledge will shape how you approach the menu, your expectations and your understanding. If we transfer this to reading and spelling, Weaver argues that you must understand the 'big ideas' and then work your way down to the small ideas (words).

An often cited study in this field was carried out by Recht and Leslie (1988) who showed that poor readers with good baseball knowledge, outperformed a group of strong readers with very little baseball knowledge in reading and understanding a comprehension about baseball. Interestingly, Lemow and colleagues (2016) note that whilst comprehension requires a strong base of prior knowledge, one of the best ways to build this prior knowledge is through exposure to books and reading. Hence they conclude that there is a need to support the development of prior knowledge as soon as possible as it can compound negatively over time (Percival, 2020).

With regard to writing, Treiman and Kessler (2014) support this view by noting that children's exposure to language influences their spelling. In their research they highlight that children often use letters in their writing (regardless of whether they were correct) that they encountered in their reading. This is not a new perspective, for Escott (1995: 19) wrote over twenty years earlier that:

> "*The material that children read may affect what they write. [...] Community and cultural traditions, learned within the context of the family, are of central importance to the child's experiences of literacy*."

This perspective, often referred to as the ‘Statistical-Learning Perspective’ (Pollo et al., 2008), offers an insightful look into spelling development, one which I think is lacking in the other phonological based perspectives. The argument that what children read/are exposed to influences their spelling is something I see every day in school. The word children read most when they first begin school is their name. When I taught in the Early Years, children with simple onset and rime names, for example *Sam* [sæm], *Nick* [nɪk] and *Tom* [tɒm], were able to use their understanding of their own name to spell words which had similar structures to their name, such as *sad* [sæd], *kick* [kɪk] and *top* [tɒp].

Despite the advantages of a ‘top down’ approach, phonemic awareness will remain a driving force to unlock comprehension. This is because comprehending requires a high cognitive demand and passing the ‘Mini-Milestone’ and entering the final phase will free up the cognitive space to be able to comprehend (Choi et al., 2017; Engen and Høien, 2002). As a result of the value of context in literary development, we are obliged therefore to consider how preschool experience shapes our understanding of context. From my understanding of the literature, preschool experience has three specific benefits for reading and spelling:

First and foremost, the ability to use context inherently requires good preschool experience. This ties back to ‘Schema Theory’ (Weaver, 1994) in that constructivists would argue that knowing the context of ‘*Lion King*’ will help the child read unfamiliar words and comprehend the story better. For example if a child comes across the unfamiliar word ‘parrot’ he is far less likely to mistake it for penguin as this would not fit the context of the ‘Lion King’. For constructivists, learning is aided by preschool experience, which aids literacy development (Stuart, 2006).

Second, there are intrinsic cognitive benefits of a rich language environment before the child attends school (Pressley, 2002; Nicolson, 2017; Sammons et al., 2004; Driessen et al., 2005). A study 25 years ago by Hart and Risley (1995) found that the difference in quality language interactions between a professional family, as opposed to a working class family, was around a factor of sixteen (4 million utterances as opposed to 250 thousand). Whilst I disagree with the use of labels such as ‘professional’ and ‘working class’, I do believe an increased exposure to language at an early age fosters better cognitive development due to coinciding with the physical growth of the brain. Studies have shown that between the ages of two to six the brain grows and the more the brain is stimulated,

the greater the number of synapse connections which are formed (Nicolson, 2017). Consequently, an increase in the number of quality language interactions can correlate to an increase in the number of synapse connections being mapped which is beneficial for future learning.

Finally, reading and spelling are forms of language which stem from oracy. Therefore if a child is exposed to a richer language environment where oracy is developed, the child is more likely to develop better reading and spelling competences (O'Connor et al., 2009; Pressley, 2002; Boethel, 2003; Sammons et al., 2004; Bierman et al., 2008). Furthermore, in language rich households, children are more likely to have access to books and nursery rhymes. Studies have shown that being exposed to good literature during preschool years positively impacts later literacy development (Sulzby and Teale, 1991). It is worth noting, however, that not all reading is equal. The questioning from parents, and their interactions with their child through the act of reading, is what impacts their cognitive development (Pressley, 2002). This ties with the Vygotskian 'Zone of Proximal Development' (ZPD) in that a supportive home ensures parents can 'scaffold' learning for their preschool children. This will both broaden their experience, which they can apply to various contexts, and also nurture cognitive development.

It is clear that what happens before school is of vital importance for later reading and spelling success. Despite this importance it is also apparent that there is a lack of longitudinal studies in this area, perhaps due to the difficulty of conducting such studies without access to school settings (Driessen et al., 2005; Jordan et al., 2001). Meanwhile, it is easy to see why this is often referred to as a cyclical process whereby 'the rich get richer and the poor get poorer' (Stanovich, 1986). Sometimes called the "Matthew Effect in Reading" [8], language rich households raise children whose language competences are better then those from non-language rich households. When they then have children they share their same rich language with them and the cycle restarts. In research carried out by El Nokali and colleagues (2010), parental involvement remains one of the key driving forces behind academic progress. This is what we, as teachers, researchers and institutions need to counteract with purposeful interventions which endeavour to help children reach the 'Mini-Milestone' and pass through the 'Full Alphabetic' phase.

[8] The Gospel of Matthew in the bible, lends this concept its name of 'the rich getting richer and the poor getting poorer (Lemow et al., 2016).

B.2.6 Difficulty with phonics

At its very core, the aim of phonics is to give children the skills to help them decode words. Therefore, when teaching decoding skills, the key is to equip children in such a way that they are able to break down unfamiliar words in isolation to derive understanding (Jolliffe, 2019). The question therefore exists: how can a child improve their phonological understanding in order to cross the 'Mini-Milestone'? Scholars (Ehri and Nunes, 2003; Wyse and Goswami, 2008; Rose, 2006) argue that phoneme awareness is important in early literacy instruction because English is an alphabetic language and there are examples which prove this with empirical research (Johnston and colleagues, 2012). Wyse and Goswami (2008) note that synthetic phonics has proven popular in almost all English speaking countries, with the United Sates of America advocating it in 2000 with the National Reading Panel and the Australian Government recommending it in 2005. In England, following a report in 2006 by Sir Jim Rose, synthetic phonics has become the means to help children with their reading and spelling. The report concluded that as a result of considering evidence and observing schools in the Scottish educational authority of Clackmannanshire, synthetic phonics was the desired approach to teaching reading and spelling (Wyse and Goswami, 2008). Furthermore, the report emphasised the importance of using just one teaching programme consistently.

The report is, however, not devoid of controversy (Ellis, 2006; Ellis and Moss, 2014; Wyse and Styles, 2007). Cain (2019) uses the institutionalised change of synthetic phonics in England as an example where education has fallen victim to policy pressure. Ellis and Moss (2014) notes that Rose only observed schools teaching synthetic phonics and did not observe the success of teaching reading and spelling in other ways. Despite claiming he considered a wide range of evidence, in fact his report is not substantiated by any empirical research (Wyse and Goswami, 2008). Nevertheless, the report paved the way for the Primary National Strategy and the amendment of the Literacy framework.

In 2007, the government published its phonic handbook, Letters and Sounds (DfES, 2007). This not only encouraged teachers to teach phonics systematically and synthetically, it was also adopted by training colleges who had the responsibility of preparing future teachers (Wyse and Goswami 2008; Hall, 2007) and consequently embedded the teaching of

synthetic phonics into the teaching standards (Glazzard, 2017). Other synthetic phonics schemes such as *Read Write Inc.* (Miskin, 2006) and *Jolly Phonics* (Lloyd and Wernham, 2010) have proven equally popular in primary settings. These schemes must, on some level, work, as 74 per cent of all children nationally met the government's expectation of reading development by the end of Year Two (DfE, 2015). Nevertheless, for those who only just meet the expectation, or continue to struggle to meet it, two questions present themselves: why does synthetic phonics not work for all children, and how can we continue to support those children who struggle with reading and spelling? To answer this, we need to explore briefly SLDs with reading and spelling.

Research is clear that there is a neuro-developmental condition which affects reading and spelling, namely dyslexia (Pennington and Pennington, 2012; Christo et al., 2009; Zeffiro and Eden, 2000). More recent methods of research have enabled a greater understanding of the specifics of brain abnormalities between 'non-dyslexic' and 'dyslexic' individuals through the use of brain imaging scans which has led scholars to note that dyslexic individuals share an enlargement of the normal left hemisphere of the brain responsible for language (Pennington and Pennington, 2012; Mittag et al., 2013; Zeffiro and Eden, 2000). Furthermore, research has also shown how this neuro-biological aspect of dyslexia has genetic roots (Neanon, 2012; Zeffiro and Eden, 2000) following a hereditary pattern (Gabrieli, 2009; Neanon, 2012; Christo et al., 2009), with a suggested 75 per cent of dyslexic children being able to trace dyslexia in their families (Gabrieli, 2009).

The most common understanding of dyslexia is that it is associated with a weakened phonological awareness. Research suggests that dyslexic individuals find internalising the link between alphabetic letters and corresponding phoneme sounds difficult (Rose, 2009; Reid, 2009; Snowling and Stackhouse, 2001). Therefore, decoding words when reading, and blending sounds when spelling can become very difficult, making progress across the developmental phases (as listed above) less fluid (Reid, 2009). In particular, the difficulty seems to manifest itself in the final stage where the relationship between the grapheme and phoneme is committed to memory (Hartas, 2006; Reid, 2009). This is because the essential correspondence between grapheme and phoneme develops differently compared to non-dyslexic peers (Snowling and Stackhouse, 2001). Consequently, this disparity in language acquisition establishes an attainment gap.

Despite its existence, there has been considerable debate regarding the value in categorising a sub-group of ‘dyslexics’ amongst a wider group of children who all find reading and spelling challenging (Elliott and Grigorenko, 2014). This argument is, in part, because there is no universally agreed upon definition for dyslexia (Mather and Wendling, 2018; Marshal, 2009; Neanon, 2009). Instead, there are so many different definitions (for example BDA, 2010; Rose, 2009; American National Institutes of Child Health and Human Development, 2002) that scholars have argued the term is too ambiguous for rigorous use (Kershner and Chaplain, 2001).

Despite the lack of a universal definition, a second characteristic of dyslexia is the difficulty with recalling information. Most commonly associated with Wolf and Bowers (1999), The Double Deficit Hypothesis builds on the phonological deficit model by including this slower processing speed as one of the contributing characteristics of dyslexia. The slow processing speed is responsible for phonological difficulties by making it harder to recall the correct phonemes and graphemes, hence becoming a double deficit (Clayton et al., 2019). It is for this reason that dyslexia assessments often involve a ‘Rapid Automatised Naming’ (RAN) to assess the speed with which individuals can rapidly name familiar objects or symbols. Whilst the advantage of such a test is that it can be administered early because it does not require a child to read anything, scholars have disagreed over its value as a dyslexia indicator (Elliott, 2017; Mather and Wendling, 2018). Again, this is because there are significant questions surrounding its ability to identify a subgroup of ‘dyslexia’ amongst a wider group who all find reading and spelling difficult and all find recall difficult (Elliott, 2017).

Nevertheless, whilst the phonological deficit is a key foundation underpinning the characteristics of dyslexia, it does not mean we must accept it in its entirety. Perhaps most thought provoking is whether the phonological deficit stems from a difficulty to decode and apply the sounds of the language, or from a difficulty to access them. If it is the latter, then scholars suggest the difficulty is far more cognitive in its origin (Ramus and Szenkovtis, 2008). In other words, difficulties with literacy stem from challenges with accessing working memory as opposed to being incapable of making phoneme-grapheme connections (Elliott, 2017). Consequently, my research explores a more balanced approach to teaching phonics, one where cognitive load is reduced. This is through the use of syllable awareness and the next literature review explains this in detail. The motivation to explore alternative approaches to phonic instruction was, however, twofold:

First, Walton and colleagues (2001) demonstrate that as long as teaching was ‘systematic’, both analytic or synthetic phonic instruction resulted in comparable progress. Similar findings have been found by the National Reading Panel (NICHHD, 2000), Torgerson (2006), Landerl (2000) and Spencer and Hanley (2003). Consequently, other phonic approaches have been sidelined despite potentially having an important role to play (Wyse and Goswami, 2008; Cunningham and Cunningham, 2003; Harrison, 2006; Hall, 2007).

Second, research conducted by Wyse and Goswami (2008) and Cunningham and Cunningham (2003) concluded that teaching literacy skills should be broadened as English is a language which is complex in both its syllabic and phonological structure. Devonshire (2013: 85) remarks that:

> “*[..] the use of phonics [phonemes] may be less suitable for English than for other languages as English has a deep orthography (writing system) where the relationship between letters and sounds is inconsistent.*”

I will argue in the subsequent literature review that the development of the skills to store words in memory, and build the wide language skills needed for self-correction, can occur through the teaching of broader phonic skills. In other words, to ensure all children can progress past the ‘Mini-Milestone’ in literacy development teachers need to have the flexibility to adapt to the reality that their class will rarely all be in the same phase working at the same pace (Read and Treiman, 2012). Glazzard (2017) argues that it is illogical to have a ‘one size fits all’ for phonics and Nicolson (2017: 52) summarises this view best with his conclusion that it is:

> “*[…] absolutely clear that different approaches are needed at different stages, and that an effective method must be able to identify for a particular child what their stage of development is, and what is actually needed to help them move to the next stage.*”

B.2.7 Conclusion

I began this literature review by stating that most children in England leave school having learnt to read and spell (Denton et al., 2006; DfE, 2015). I explained that most children achieved this by engaging in a developmental process towards fluency (Ehri, 2015). To that end, I analysed our varying understandings of fluency, either in terms of phonological competence, independence, speed or understanding but concluded with my own experience of children becoming 'self-sufficient'. I categorised this self-sufficiency with reading and spelling as the 'Mini-Milestone' in early literacy development. It is the defining moment when a child has enough phonological awareness to cope with the demands of encountering unfamiliar words, both with reading and spelling.

This literature review also explored the importance of a good, vocabulary rich pre-school experience, both in terms of the inherent cognitive benefits of building synapse connections, broadening vocabulary which is crucial for general language development, but also in the ability to shape an in-depth bank to draw upon for context. The aim of reading and spelling is comprehension and competence respectively and this is supported through the use of context. Nevertheless, the initial progress between the phases begins with phonological awareness.

In the United Kingdom synthetic phonics is the method of choice for primary schools to achieve this developmental acquisition of reading and spelling skills. This is self evident in the popular phonic schemes, the DfE guidance and DfE assessments but I concluded this literature review with two questions which are hopefully answered in the next literature review: *why does synthetic phonics not work for all children, and how can we continue to support those children who struggle with reading and spelling?* Consequently, this literature review has hopefully acted as the foundation for the next section. By understanding how children progress developmentally with reading and spelling, I will now explore whether there is more we can do to help children achieve the 'Mini-Milestone' in literacy development.

(B) 3, The importance of syllable awareness

-Syllables and reading/spelling benefits.

-Syllables and specific learning difficulties.

First written in March 2016, final edit February 2021.

B.3.1 Preamble

I believe this literature review on syllables epitomises, more than any other, the cyclical nature of AR. This is not just because I have revisited and revised the section on numerous occasions, but rather the process of engaging with this literature review has connected theory and practice through a constant back-and-forth (Ripamonti et al., 2015; Hine and Lavery, 2014).

As with the previous section, my understanding of syllables began with my initial reading as part of my MSc. I then returned to my practice to explore whether the reality of what I was seeing was supported by the literature. I then returned to the literature with greater focus to help me: (1) prepare for my registration viva but also, (2) use my understanding of the literature to help me design my intervention by clearly working out key teaching principles. These are summarised as rules which I have included within the literature review as I feel they retain great value, but the intervention booklet itself can also be found within the appendix (please see appendix H.4).

I recognise that this section has a very long heading. I tried, several times, to pull this section apart and form two distinct subsections [9] but I found that the arguments were too interrelated. Consequently, this literature review is an amalgamation of two important themes which together will argue for the importance of syllable teaching. This will be

[9] One, which focused on the link between syllable awareness and its importance on early literacy development. The other, exploring the debate between syllable awareness and children who find reading and spelling difficult.

presented twofold; first, with regard to the role syllables play in learning to read and spell, and second, the specific importance syllable awareness might have for those children who find literacy challenging.

B.3.2 Introduction

My interest in syllables was first piqued with the following paradox:

1) Teachers are advised by the government (DfE, 2007) to teach children how to read and spell using synthetic phonics (breaking words down into their individual phonemes). Their publication (Letters and Sounds, 2007) is almost exclusively comprised of strategies to teach phoneme segmentation.

2) Despite this, at the end, the publication admits that for older children synthetic phonics may not be the most appropriate reading and spelling strategy, and that syllable segmentation may by more useful. Apart from a few games, syllable segmentation is hardly mentioned, raising the question: how does the publication expect children to become proficient at syllable segmentation if it does not advocate teaching it?

Like many KS1 teachers across England, I taught children to read and spell using synthetic phonics. I followed a prescribed synthetic phonic scheme which ensured I taught every English phoneme in the correct sequence. Each phonic lesson was structured so that children were given the opportunity to apply their understanding of phonemes to practise reading (decoding) and spelling (segmenting) words. Despite this comprehensive foundation, I found myself asking whether this strategy would still be useful when they tried to spell the word '*photosynthesis*' in Year Six?

This thought forced me to reflect on *what* it was that I wanted the children to achieve by the end of the year. With regard to reading and spelling, teachers often talk about equipping children with 'useful strategies' to help them achieve fluency. As I discussed in the first literature review, my view of fluency is closely linked with independence by passing the Mini-Milestone. Consequently, this literature review explores syllables from two main approaches. First, syllables might help children achieve greater fluency with

reading and spelling by being a useful skill to help them decode and segment words. Second, it might be that syllabic awareness is an important step as part of a more holistic phonological development. I will endeavour to explore each argument throughout this literature review.

To begin, from my reading of the literature, I feel it is important to keep in mind two important features of a syllable:

1. Prosody: syllables play a very important role in speech. There is a natural rhythm to the way we speak due to the innate stressed and unstressed pronunciation of syllables in words (Leong and Goswami, 2014).

2. Onset and rime: a syllable, in its simplest form, can be broken into an onset and rime. The onset is the beginning consonant (or consonant cluster) and the rime is the vowel-consonant ending.

These two features will be explained in much greater depth later in the literature review but I wanted to give an overview in its simplest form as a starting point for the next couple of sections.

B.3.3 What might be the benefit of teaching syllables?

From the very outset of my AR, I was clear that I wanted to avoid getting myself entangled in comparing different phonic approaches and exploring which is better. Instead I was interested by Glazzard (2017: 45) who wrote that:

> "*Although logic suggests that one size does not fit all, the emphasis on synthetic phonics in the teachers standards suggests quite the opposite*."

Glazzard goes on to state that this reliance on synthetic phonics is 'deeply worrying'. Whilst there are numerous studies linking the predictive power of phoneme awareness with reading ability (Choi et al., 2017; Engen and Høien, 2002; Hatcher et al., 2004), there

are similar studies showing the predictive power of syllable awareness and reading ability (Mehta et al., 2018; Bridges and Catts, 2011; Chetail and Mathey, 2008; McBride et al., 2002). Equally, whilst there are examples of research advocating synthetic phonics as the most effective way to teach reading and spelling (Johnston et al., 2012; Rose, 2007), there are also similar studies which suggest teaching analytic phonics is just as effective as long as it is done systematically (Glazzard, 2017; Wyse and Goswami, 2008; Torgerson et al., 2006). Therefore, rather than getting caught up in this debate, my overarching aim was to explore how a syllable intervention might *supplement* the embedded synthetic phonic curriculum which already existed in my school to create a more diverse 'one fit for all'. Research from Price-Mohr and Price (2017, 2018) argued that boys benefit from a mixed-methods approach to teaching phonics, a combination of synthetic and analytic phonics, and I was keen to explore this myself. From my understanding of the literature, I felt there were four compelling arguments why teaching syllable segmentation skills were advantageous when learning to read and spell (reaching the 'Mini-Milestone'). I will explain three of the reasons now and return to a fourth argument later in this section:

1) Syllable segmentation reduces the connections from print to memory (cognitive load) which could help with storing words in the brain; this could aid reading and also transfer to spelling.

2) Having a greater syllabic awareness might increase the use of onset and rime patterns to help reading and spelling.

3) Linked with argument (2); phonological development is hierarchical, with children moving from *syllable*, to *onset and rime* to *phoneme* awareness. Therefore it is crucial syllable awareness is developed otherwise the remaining phonological development could be impaired.

This section will now flesh out each of these arguments in turn:

1) Syllable segmentation reduces the connections from print to memory

Returning to the paradox at the start of this literature review, it seems logical that children need multisyllabic tools to deal with multisyllabic words (Tarraran, 2018; Duncan and Symour, 2003). This idea is not new and over thirty years ago Cox and Hutcheson (1988: 238) wrote that:

> "*[...]skill in recognising syllable division patterns and accent are vital prerequisites for success in spelling.*"

Stage Six of Letters and Sounds (DfE, 2007: 176) also notes that syllables are an appropriate tool to, "provide a routine for spelling long words." Breaking words which are two to five syllables long into syllable segments helps make the word more manageable. Bhattacharya and Ehri (2004: 331) refer to this skill as 'syllabication'. Consequently, teaching children syllable segmentation tools can help children tackle polysyllabic words - for example most children learn to spell *Wednesday* [wednzdı] by segmenting it into three syllables *Wed/nes/day*.

Early research conducted by Ehri (1987) showed her that there was a connection between syllable segmentation skills and progress with literacy. In her research, Ehri asked children in the fourth grade how many syllables there were in words where the syllable boundaries were ambiguous, for example '*interesting'*: does it have three or four syllables? She tested children's syllable division with just over ten words which all had similar syllable structures and then asked the children to spell the same words. In her conclusion she notes that children who correctly identified how many syllables there were in a word were more likely to spell the word correctly. Despite being a small study, the findings suggested that there could be a link between syllable awareness and spelling proficiency.

However, working almost two decades later with Bhattacharya (Bhattacharya & Ehri 2004), she supported her earlier findings with further research where she analysed the benefits of instructing young adolescents in segmenting words into grapho-syllabic units. Like the previous research, findings from the experiment indicated that children who improved their syllable awareness also performed better in reading and spelling tasks. Finally, writing a year later Ehri (2005: 175) noted that the correlation between syllable segmentation skills

and literacy attainment is achieved by reducing the number of connections between word and memory. This takes place in the final, consolidated phase of literacy development. For example *h.o.l.i.d.ay* [ˈhɒlədeɪ] can be broken into *hol/i/day*. The number of units is reduced from 6 phonemes to 3 syllables therefore making it easier to remember and retrieve from memory. This skill links with theories on cognitive load (Wiliam, 2017) especially with research suggesting that working memory can only hold roughly four chunks of information effectively (Cowan, 2001). Chetail and Mathey (2008) similarly state that syllable activation permeates into other syllabically stored connections (syllabic neighbours) thereby making it easier to read similar words.

Henry (1988: 266) gives the example of the word *understatement* [ˌʌndəˈsteɪtmənt]. Suppose that this word is unfamiliar. A good reader, using the differing skills set available to read an unknown word, has three options:

1. *Understatement* segmented as phonemes would look like u.n.d.er.s.t.a.t.e.m.e.n.t
2. *Understatement* as syllables would look like un/der/state/ment
3. *Understatement* as morphemes would look like under-state-ment

Henry (1988: 266) argues that the good reader would use a combination of all three and is, only thereby, successful. In contrast a poor reader, too reliant on "sounding out" unfamiliar words, will remain stuck:

> "*Beginning or poor readers, on the other hand, appear to use only one strategy; they "sound out" the word by letter-sound correspondences. While this may be reliable for short, regular words, it furnishes little help for longer words.*"

At this point it should be noted that there is growing (and convincing) literature with regard to the importance of morphology in early literacy development (Levesque, Breadmore and Deacon, 2020; Carlisel and Kearns, 2017; Duncan, 2018). Despite sitting outside the scope of this thesis, I do draw upon some of these arguments. For example, breaking words into syllables which are also morphemes can assist in committing the word to memory because the meaning attached to the syllable supports it being learnt (Levesque et al., 2020). In addition, arguments for the importance of morphological segmentation

skills ultimately support my overarching argument that teachers should diversify their phonics teaching. This will become a recurring argument throughout the thesis.

2) Using onset and rime patterns to help reading and spelling

As briefly mentioned, an onset and rime form a syllable. The onset is usually the beginning consonant (or consonant cluster) and the rime is the vowel-consonant ending. This vowel-consonant ending is the peak (vowel nucleus and coda). For example in the word 'sun', *s*- would form the onset and -*un* would form the rime. Crucially, Treiman (2013) argued that this awareness of onset and rime occurs before breaking the word down further into phonemes.

Scholars (Glazzard, 2017; Stackhouse and Wells, 1997; Goswami and Bryant, 1990) advocate the focus on onset and rime as a successful approach to reading. Teaching onset and rime offers children the opportunity to memorise common spelling patterns. For example if a child can already read the words *hat* [hæt], *cat* [cæt], *fat* [fæt] but comes across the unfamiliar word *pat* [pæt], the child can use its existing understanding of the rime *-at* and apply it with a new initial sound (onset) *p*-. Putting them together the child is able to read the word *pat*. Stackhouse and Wells (1997: 190) note that:

> "*This [onset and rime] is much more economical than having to segment every bit of a new word and blend it together*."

Research carried out by Barber and colleagues (2004) and Chetail and Mathey (2008) all comment that this benefit also filters across into other syllabic structures with similar syllable units. In this respect it helps build further connections with other words. For example, rather than having to read or spell 'Batman' [Bætmən] by decoding/segmenting each phoneme (b.a.t.m.a.n), you can use your knowledge of the rime *-at* to work out *-an* and shorten it into b.at.m.an. Whilst simplistic, this example illustrates how onset and rime can help automate the decoding/segmenting process for the individual.

Further research in this area was conducted by Berninger and Wolf (2009) who argued that an understanding of graphemes and phonemes is 'not enough'. Children need to be given the tools so that they are able to rely on syllable patterns. For example suffixes such

as *-ing*, *-le* or *-ed*, once learnt, can become an important part of the spelling process by building confidence and speeding up the process. Ultimately, these advantages listed above help support the argument that analytic phonics can play an important role in supporting reading development (Glazzard, 2017; Wyse and Goswami, 2008; Torgerson et al., 2006).

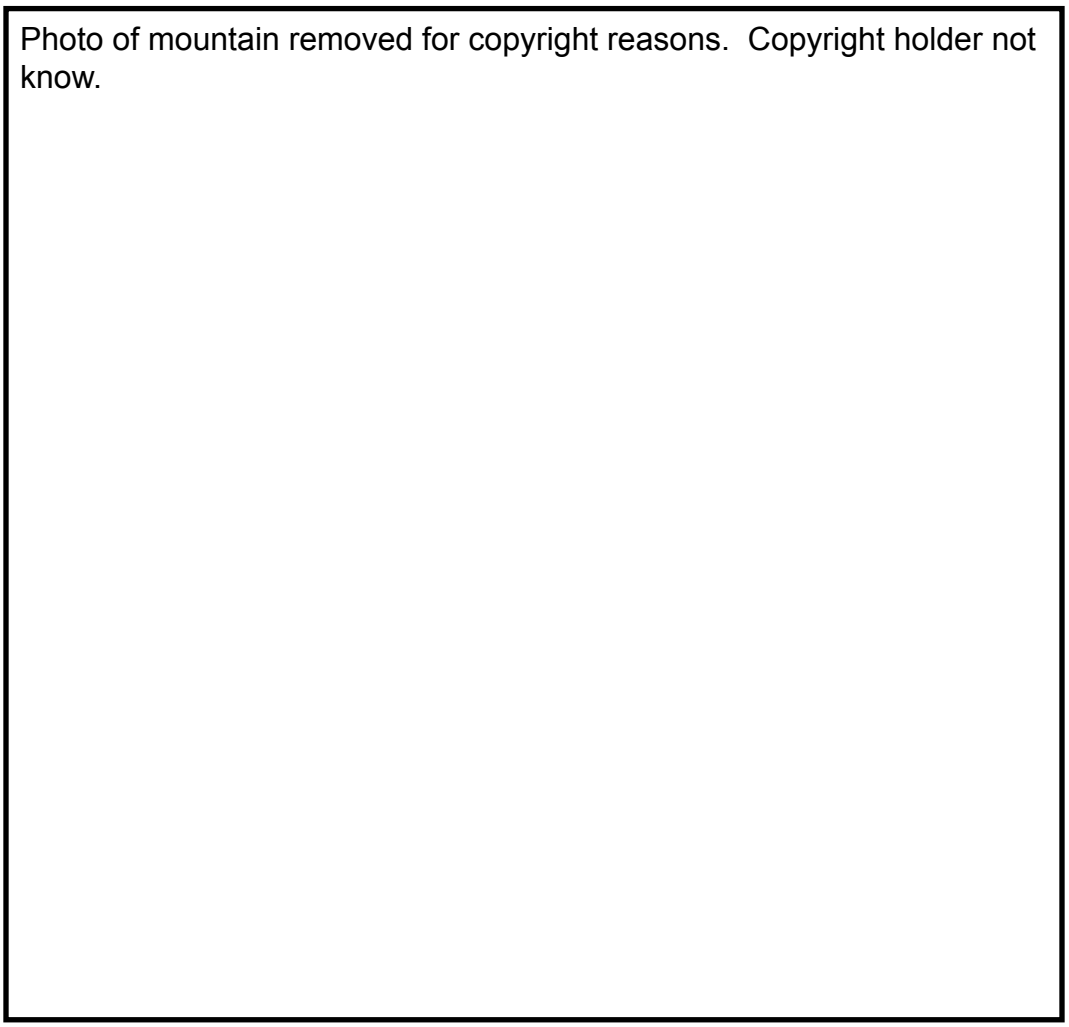
3) Phonological hierarchy

The first two arguments centre on the idea that syllable segmentation skills benefit the learner by giving them an easier way to decode and segment words. In other words, the argument presented is that syllable awareness is worth teaching because it is another tool children can use to help them with reading and spelling. The third argument I wish to present is different; it treats syllables awareness not as *useful* but rather as *necessary*. This idea stems from the research which suggests that phonological awareness is a developmental process following a hierarchical structure; beginning with syllabic awareness it then filters down to onset and rime and finally ends with phonemic awareness (Brady and Shankweiler, 2013; Treiman, 2013; Zieger and Goswami, 2005; Goswami, 2006; Mehler et al., 1981). Increasing numbers of studies have shown syllable awareness to develop naturally before school instruction by listening to spoken language with its naturally stressed and unstressed syllabic rhythm (Leong and Goswami, 2014; Mehta et al., 2018; Hartas, 2006; Choi et al., 2017; Goswami, 2006; Chew, 1997). Distinguishing syllables prosodically is the first step in phonological development as syllabic awareness then transfers to an awareness of onset and rime (Treiman, 2013) which finally results in the learner being able to segment each phoneme in turn.

In short, it is argued that syllable awareness is the basic segmentation unit and Mehler and colleagues (1981) famously demonstrated this with their research which showed that the phonemes were more easily detected in words where they corresponded to the first syllable. For example p/a/l was more easily detected in ‘palace’ where the first syllable was ‘pal’ as opposed to ‘palmier’ where the first syllable was ‘pa’. This is, however, an area of debate with Norris and Cutler (1988) arguing the opposite seven years later in their research. Nevertheless, recent studies, such as that of Barber and colleagues (2004) conclude that in languages where clear boundaries between syllables exist, syllables are the fundamental lexical unit.

This hierarchy is a convincing argument as to why syllable segmentation skills should be taught and I have endeavoured to represent this hierarchical structure in figure B.3.3 below:

Figure B.3.3 Perceived Phonological Hierarchy



The question is: what happens if this developmental process is blocked? If awareness at the syllabic level does not fully develop, does it stand to reason that the awareness of onset and rime and phonemes could subsequently be impaired? In this regard, the hierarchical structure identifies a need for teachers to focus on ensuring children have a good syllabic understanding at the start of their literacy development so that they can then build down to smaller, phoneme parts (Brady and Shankweiler, 2013; Treiman, 2013). It is important to note that research in this field is not conclusive. In a study completed by

Mesmer and Williams (2015), they found that syllabic awareness was just as much dependent on phonemic awareness, thereby questioning a top-down hierarchy.

Nevertheless, Goswami (2006) comments on her findings by suggesting that they serve as evidence for the need to flood young (pre-reading) children with nursery rhymes. It is hoped that by improving rhyme awareness before children begin schooling, they will improve their ability to detect stress and syllabification which in turn would help improve phonological skills. This links back to the importance of pre-school experience discussed in the previous literature review. The importance of developing a firm foundation across rhyme and syllables echoes the argument that educators must not become too reliant on teaching just one skill.

This understanding of a phonological hierarchy was an important feature of my intervention. I reflected on the research by Tarraran (2018) who argued that if you implement an intervention that targets training stress patterns, positive progress can be made in reading. Similarly, Leong and Goswami (2014) conclude in their research that there are potentially lucrative overlaps with music, especially in reinforcing rhythm. As I will go on to explain later, much of my initial intervention focused on rhyme based tasks with an inherent prosodic focus. For example in the younger year groups, children spent a lot of time listening and playing along with stories such as, ‘Tanka Tanka Skunk’ by Steve Webb.

B.3.4 Current use of syllables in primary education

> “*Just as the lack of definition of life (or death) does not prevent biologists from studying living things, the lack of a definition of the syllable should not prevent us from studying syllables*.”
>
> Duanmu (2000: 36)

A syllable is the smallest spoken unit (Norris and Cutler, 1988) but what does that mean? One of the reasons why teachers perceive syllables as challenging is due to their own misunderstanding of what they are, how they are defined and how one would go about teaching them (Duanmu, 2009; Bhattacharya and Ehri, 2004). For example Henderson

(1985) exemplifies this difficulty with the example: '*interest'* [ˈɪntrɪst]; does it have two or three syllables? Do the number of syllables change if you read it or speak it [10]? Teachers need a thorough understanding of language to be able to teach it (Allott, 2019). If that is not possible then, as Henderson goes on to argue, the ambiguity ultimately causes the teaching of syllables to be largely superficial in schools.

Duncan and Symour (2003) note that although children are comfortable with reading monosyllabic words, they find breaking it down into its onset and rime components challenging. Over twenty years ago, Henry (1988) assessed decoding strategies in young children. He also concluded that children found segmenting words into syllables extremely difficult. Moreover he argued that very few children used syllable segmentation as a strategy for comprehending long, unfamiliar words. This led him to believe that children had little exposure to specific syllable teaching or tasks to practise syllable segmentation.

My teaching experience would lead me to believe that, thirty years on, the situation with teaching syllables has not changed much. As part of my MSc, staff involved in the AR were able to explain the concept of syllables as being a 'beat', something they could 'hear' but they were unable to distinguish breaks confidently, nor explain the rules which underpin the natural segmentation of words in speech. According to the report led by Rose (DfE, 2006), young children learning to read and spell benefit significantly when taught synthetic phonics. Whilst the report has been criticised by many (Wyse and Goswami, 2008), the consequences of these findings have, as we have already discussed, been influential in shaping current school practice. In the short term, it pushed the government to publish Letters and Sounds (DfE, 2007), a synthetic phonics handbook for primary school teachers. Long term, it has resulted in the majority of English primary schools adopting a synthetic phonic approach to reading and spelling. Many companies have profited from packaging and selling whole school resources which promote the success of a synthetic phonic approach, and such is the prevalence of synthetic phonics that the government has recently introduced a national assessment for six year old children to test them on it.

When reflecting on the current use of syllables in primary education, I began by analysing phonic schemes used in schools at the time of writing (2020), such as *Letters and Sounds*

[10] Henderson (1985) concludes that spoken orally, '*interest'* would, more often than not, be spoken with two syllables (in/trest), however it would be spelt with three (in/ter/est)

(DfE, 2007). The Letters and Sounds handbook systematically outlines the order and timeline for when phonemes should be taught and how it corresponds to a child's development. Letters and Sounds is not the only publication to do this; *Read Write Inc.* (RWI) (Miskin, 2006) and *Jolly Phonics* (Lloyd and Wernham, 2010) are further examples of successful systematic synthetic phonic schemes which teachers use. By definition, these synthetic phonics schemes focus on teaching grapheme-phoneme correspondence, and therefore little attention is given to the morphemic or syllabic structure of the word.

To contextualise this phenomenon more clearly, the word 'syllables' is mentioned, in varying and differing contexts, 29 times in the entire 208 pages of *Letters and Sounds*. Only 10 uses of the word 'syllables' refer to segmenting words *into* syllables; on the other 19 occasions, the word 'syllable' is used to reference a certain length syllable word for a particular phonemic activity.

The game 'Clap and Count' in *Letters and Sounds* is the only game specifically dedicated to teaching young children to use syllables in spelling difficult polysyllabic words. Whilst the game is an excellent teaching tool and effective, I would argue that it is wasted by appearing only once in the document, on page 176. Before 'Clap and Count', segmenting words into syllables is mentioned four times, once in every stage. However, in stages two, three and four the examples teachers are encouraged to use are: *sun/set*, *car/park* and *lunch/box* respectively. Whilst these examples are fine and encourage teachers to explore syllables, they are all two syllable compound words where each syllable forms its own morpheme. This teaching approach does not help children clarify the concept of a syllable nor does it help them learn how to correctly segment three or four syllable words. Only Stage Five differs in this respect with the example of segmenting *thir/teen*.

Whilst *Letters and Sounds* is recommended by the Department for Education, it is not the only phonic programme used by primary school teachers. As already mentioned, RWI (Miskin, 2006) and *Jolly Phonics* (Lloyd and Wernham, 2010) are two other popular examples of schemes adopted by schools to help ensure their Key Stage One children learn to read and spell. The disproportionate attention given to synthetic phonics in *Letters and Sounds* is, however, equally evident in RWI and *Jolly Phonics*.

In the old *Phonics Handbook* published by *Jolly Phonics* (Lloyd, 1998) almost the entire document is devoted to exemplifying how a synthetic phonic approach should be taught.

Within the entire handbook there is only one example where syllables are mentioned as an activity; this is on page 26 and the children are encouraged to tap the number of syllables they can hear in a word. This lack of attention to syllables is clearly out of proportion to the focus on phonemes, however even this game seems to have been removed from the new *Teacher's Book* published by *Jolly Phonics* (Lloyd and Wernham, 2010) twelve years later. In this new publication, no explicit teaching activity focusing on syllable segmentation can be found.

Syllables are mentioned more in the RWI Handbook (Miskin, 2006). In the handbook one activity (pg 36) could be found where teachers were recommended to ask their class to read words and segment them into both syllables as well as graphemes. This was, however, outlined as a specific reading activity. With regard to spelling, the handbook detailed 9 activities involving phonics. Within these activities only one referenced syllables, but the purpose of the task was to count graphemes in multi-syllabic words which had been segmented into syllables. This lack of attention to syllable segmentation is perhaps unsurprising as the scheme advocates teaching children through frequent use of 'Fred Talk' (which is when a teacher only speaks in individual sounds). What was surprising, however, was that in the RWI Spelling Programme, designed to follow on from the Phonics instruction, children were routinely asked to segment complex polysyllabic words into phonemes.

I cannot necessarily assume that *all* primary schools in England do not teach syllable segmentation to the same degree as synthetic phonics. However, since syllable segmentation, as a skill, is not included under the statutory requirements in the National Curriculum for Year One (DfE, 2013), and does not feature highly in the Primary National Strategy Framework for Literacy (DfE, 2006), or in popular phonic schemes (for example *Letters and Sounds* (DfE, 2007), RWI (Miskin, 2006) and *Jolly Phonics* (Lloyd and Wernham, 2010)), it seems reasonable to assume that it is being taught less than synthetic phonics.

I want to conclude this section with four assumptions derived from the reviewed literature so far:

1. Research suggests that up to the age when children are formally instructed in grapheme-phoneme correspondence in schools, they develop a natural syllabic

awareness of words (Mehta et al., 2018; Choi et al., 2017; Leong and Goswami, 2014; Hartas, 2006; Chew, 1997).

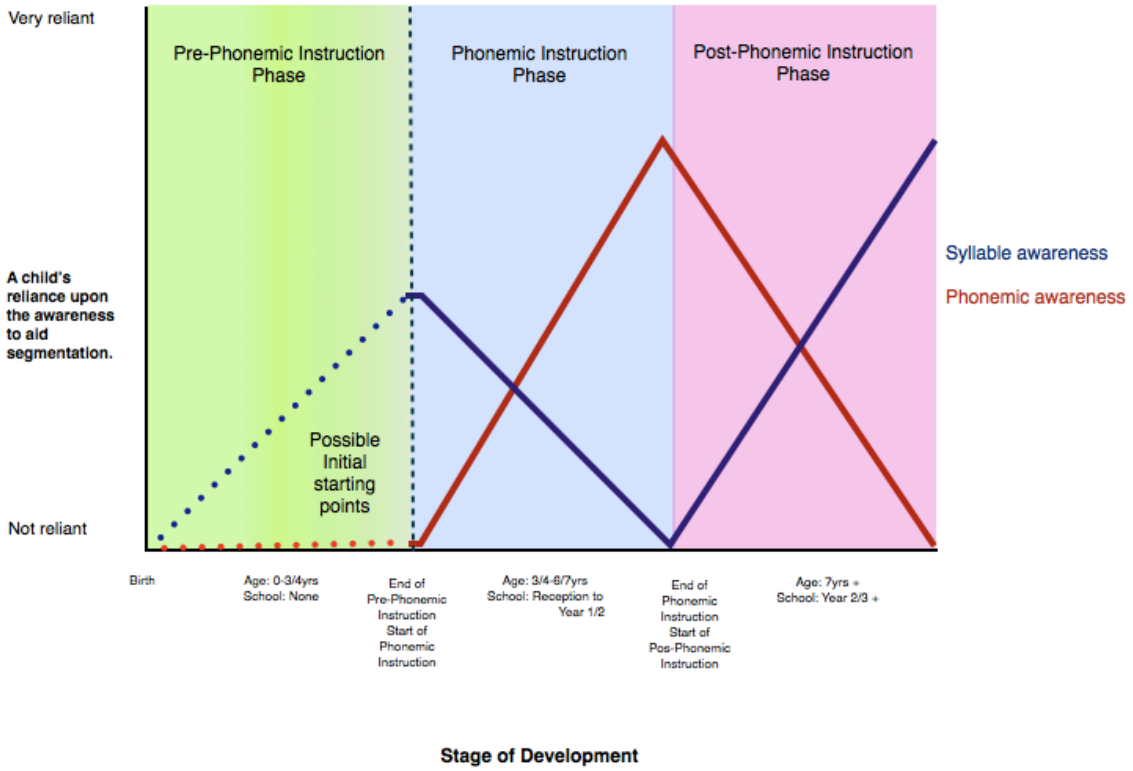
2. This is because phonological awareness is a developmental process following a hierarchical structure, beginning with syllabic awareness which then filters down to onset and rime and finally ending with phonemic awareness (Brady and Shankweiler, 2013; Treiman, 2013; Zieger and Goswami, 2005; Goswami, 2003).

3. **But**, despite this developing awareness of syllables, children are taught to segment and blend words phonemically once they begin school with little attention given to syllables in any of the commonly used synthetic phonic programmes.

4. Whilst this may be successful in teaching young children how to read and write simple CVC words, we have already explored that there is a limit to the usefulness of synthetic phonics and that syllable segmentation is more appropriate as words become increasingly complex in length (DfE, 2007).

Consequently, one might see the role syllable awareness plays in a child's development as being in a state of flux throughout a child's education. First, children leave the pre-reading phase with some syllabic awareness (Mehta et al., 2018; Choi et al., 2017; Leong and Goswami, 2014; Hartas, 2006; Chew, 1997). Children then learn to segment and blend words phonemically when they enter school with little attention on syllables (as I have explained, syllables do not feature highly in the statutory requirements for Year One (DfE, 2013), Primary National Strategy Framework for Literacy (DfE, 2006) nor popular phonic schemes (*Letters and Sounds* (DfE, 2007), RWI (Miskin, 2006) and *Jolly Phonics* (Lloyd and Wernham, 2010)). Nevertheless, later on in their education, children are then encouraged to refer back to syllable understanding to help them spell more complex, polysyllabic words (DfE, 2007). I have tried to illustrate this flux in figure B.3.4.1 below.

Figure B.3.4.1 Syllable and Phoneme Relationship - The Perception



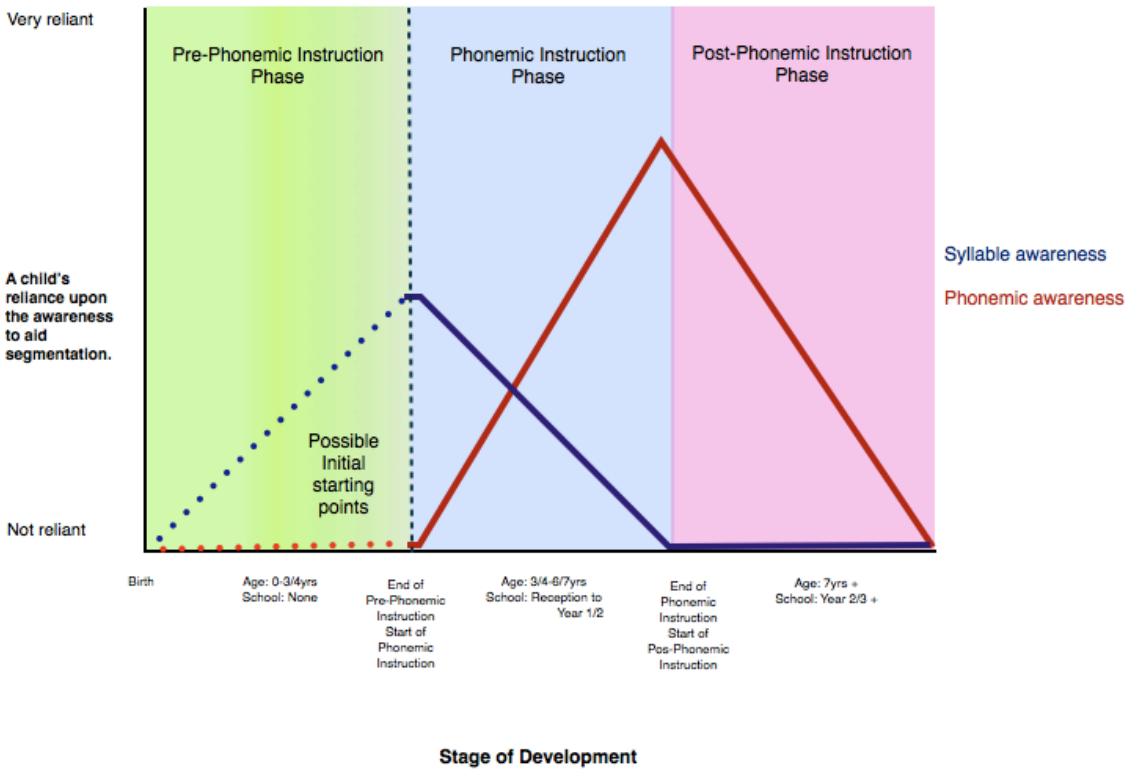
The above figure shows syllable awareness eventually becoming the most prevalent decoding tool. This ties in with ideas found in the literature that awareness of onset and rimes develops without 'conscious attention' (Choi et al., 2017). Whilst for some this may happen, this literature review has already presented research arguing that for some children this awareness does not develop without instruction. Over twenty years ago, Henry (1988) assessed decoding strategies in young children. He concluded that children found segmenting words into syllables extremely difficult. This is supported with more recent research from Tarraran (2018) who concedes that whilst syllable awareness might be easy for some, it is much harder for others. I found further support for this difficulty in research presented by Mesmer and Lake (2020) analysing finger point reading. In figure B.3.4.2 below, I have copied their table as it illustrates the difficulty children have with syllables. In the example, a child is able to recite the sentence but mistakenly points to 'son' whilst saying the second syllable of '*ker*' in '*ba/ker*'. Mesmer and Lake conclude that whilst syllables are easy to pronounce, their graphemic representation is much harder to distinguish and follow. This is because children need to learn that multiple syllabic units can exist in one visual unit (word).

Figure B.3.4.2 Finger Point Reading

Text	Tom	Tom	the	baker's		son
Child reciting	Tom	Tom	the	ba	ker's	son
Child pointing	✅	✅	✅	✅	❌	

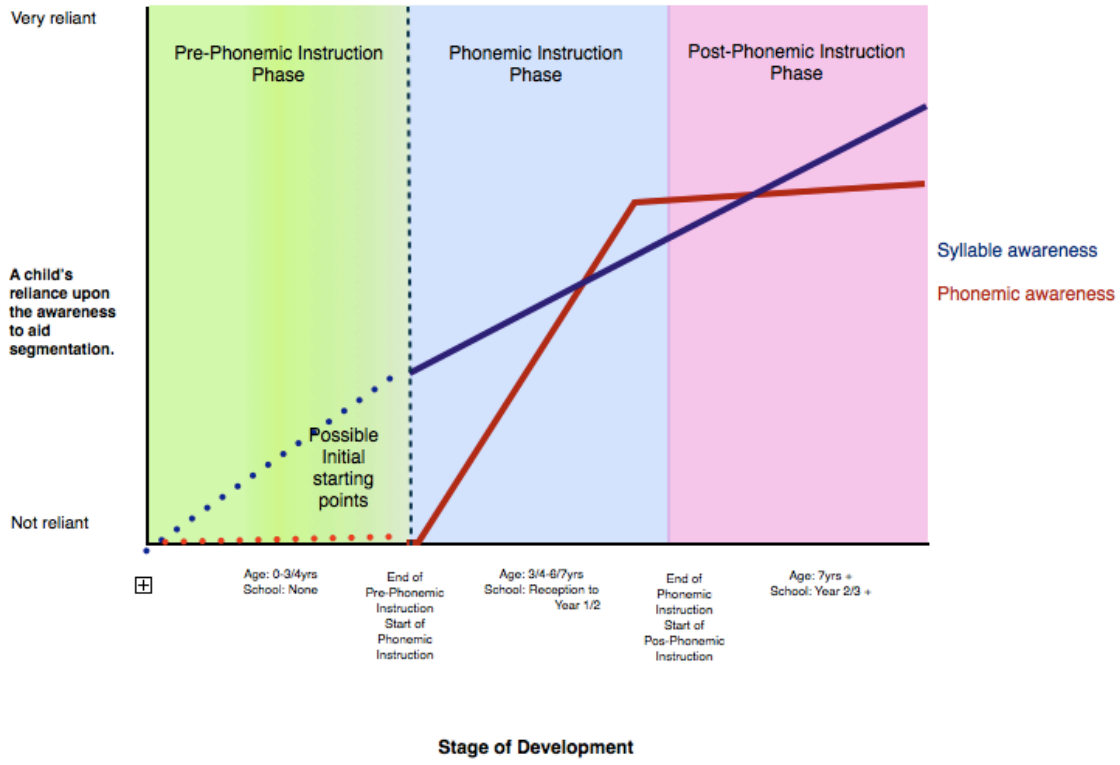
Like most skills, if you do not have opportunities to practise, you cannot expect to improve (Henry, 1988). In light of this, perhaps the reality of phonemic and syllabic awareness looks more like figure B.3.4.3 below. In this figure a natural syllable awareness is replaced by phonemic awareness during the phonemic instruction phase but does not improve again as no syllable instruction has taken place. The subsequent difficulty children have with reading and spelling may therefore be because they do not have an adequate tool at their disposal which can help segment complicated polysyllabic words.

Figure B.3.4.3 Syllable and Phoneme Relationship - The Reality



Nevertheless, having considered the reasons why teaching syllables is advantageous, might an *ideal trajectory* for syllable awareness be one where syllable awareness develops continuously? Phonemic awareness could overtake syllable awareness in the 'phonemic instruction' phase but would eventually give way to syllable awareness again. Under this model, phonemic awareness would enable young children to learn to read and write simple CVC words, but they would also be constantly improving their ability to spell polysyllabic words as recommended by Letters and Sounds (DfE, 2007).

Figure B.3.4.4 Syllable and Phoneme Relationship - The Ideal



The obvious objection to this argument is that teaching syllable and phoneme segmentation simultaneously may be too overwhelming for a five year old child. Along similar lines, Johnston and Watson (2005) argue that synthetic phonics should be taught before any other type of reading tuition is introduced. These are important criticisms which will be explored in further detail later but are nevertheless worth raising now. My own teaching experience would suggest that children are more than capable of being taught different skills simultaneously which is corroborated by Bayetto (2014: 2) who writes:

> "*Development of phonological awareness is not linear in nature so teachers may simultaneously teach more than one of the skills. Students do not need full mastery of one skill before moving onto another*."

Consequently, is it a problem if we do not teach syllable segmentation? I think it is. I have highlighted three key areas where syllable awareness would be beneficial. Like any literary skill, syllable segmentation needs to be taught to ensure it can become a useful tool for children in helping them become fluent readers and writers. To achieve greater syllable awareness, popular phonic schemes used by teachers today do not need to deviate too much from their synthetic phonic core. Teachers could continue teaching children each phoneme in a sequenced order, but do so alongside occasional examples of the words being segmented into syllables. I argue that in order to keep children constantly moving along the trajectory shown in the third model above, syllable segmentation does not need to take precedence, it just needs to remain a taught skill.

I carried this argument into my own intervention. I knew synthetic phonics would always remain an important part of phonic teaching in my school but I wanted to supplement this with syllable skills for all the reasons listed above. To do this though, I needed to approach the intervention work with a firm foundation of *how* syllables are broken into their onset and rime segments. This could only be achieved by establishing clear rules which I could depend on. I used the literature (Snowling and Stackhouse, 2001; Blevins, 2004) to help and I include a summary of these rules in section F.2.1.

B.3.5 Why might specific children benefit from improving their syllable awareness?

> *"A bright, well educated, adult dyslexic recently declared passionately 'Knowing basic phonics is not enough! An efficient, structured logical scientific, reliably automatic system for dividing and pronouncing longer words was an essential prerequisite for my academic literacy' ."*
>
> (Cox and Hutcheson, 1988: 227)

In this literature review I have argued that teaching syllable awareness has the following four benefits:

1. It reduces cognitive load by reducing the number of connections from print to memory.
2. Onset and rime patterns help the individual learn common phonetic patterns.
3. Syllable awareness is an important first step in phonetic development due to its hierarchical structure.
4. If syllable awareness develops naturally in the pre-school phase, why stop teaching it only to recommend it after phonemic instruction has taken place?

In this section I explore the idea that whilst these are worthy reasons to teach syllables for their own sake, there may be a specific benefit to teach syllables for those individuals who find reading and spelling difficult. This is because either:

1. If children are struggling to learn to read and spell with synthetic phonics, then perhaps the problem could be with synthetic phonics itself and we need to look at other phonic strategies such as syllables or morphology?

   or,

2. There is a specific syllabic difficulty faced by children who find reading and spelling difficult.

1. 'Perhaps the problem could be with synthetic phonics?'

Whilst some of this has already been covered in the previous literature review, I would like to review an analogy by Slavin (1996: 4) as it provokes us into thinking carefully about where we should prioritise our efforts.

> "*Once upon a time, there was a town whose playground was at the edge of a cliff. Every so often a child would fall off the cliff. Finally, the town council decided that something should be done about the serious injuries to children. After much discussion, however, the council was deadlocked. Some council members wanted to put a fence at the top of the cliff, but others wanted to put an ambulance at the bottom*."

It would seem obvious that the response should be to build a fence. When I imagine the town building the fence I picture them building one that is not only designed for children, I envisage a fence that would be equally capable of stopping adults, and even animals, from falling. This reflection is crucial for understanding the support schools should prioritise when it comes to reading and spelling. Teachers would also much rather *build a fence* than invest in *ambulances* but my experience of phonic interventions is that they are very much 'tailored fences' and as a result schools are at risk of letting children fall by not adopting a broad enough provision with their phonics.

My argument is that because 'dyslexia' does not have a universal definition, identifiable characteristics or rigorous assessment systems, the correct fence would be almost impossible to design. Instead a broader intervention, one that captures those who are dyslexic as well as those who find reading and spelling difficult without the label would arguably be more useful. Consequently, I believe we need to move past building a perfect fence for dyslexia and instead focus on ensuring all children are prevented from falling (Elliott and Gibbs, 2009).

In the previous literature review I briefly explored the 'phonological deficit' (Rose, 2009; Reid, 2009; Snowling, 2001; Stanovich, 1988) and the 'Double Deficit' hypotheses (Wolf and Bowers, 1999) and I believe that syllables have a place in both of these arguments.

First, both the phonological deficit and the double deficit question the dyslexic child's ability to recall easily (Marther and Wendling, 2012; Reid, 2009; Snowling and Stackhouse, 2001). With this in mind, Elliott and Grigorenko (2014) suggest that memory is called upon when attempting to segment long polysyllabic words. Therefore, if children with specific difficulties are confronted with long words, their short-term memory is less well-equipped to retrieve all the phonemes from memory in order to segment them effectively.

The argument made by Ehri (2005) that syllable segmentation reduces the connections from print to memory provides a possible solution for this difficulty. It is easy to see how reducing the number of connections from print to memory could be useful for children who find rapid recall difficult. For example *h.o.l.i.d.ay* would be broken into *hol/i/day,* reducing the demands in cognitive processing and speeding up the decoding and segmenting task. For children who have been identified as having poor recall this would seem a logical benefit. Tarraran (2018) carried out research which supports this view whereby children in Year 3 who struggled with reading polysyllabic words were given a syllabic intervention, and post-test results showed that as a result they significantly improved their reading compared to those who did not receive the intervention. Caution must, however, be heeded as Tarraran focused only on 5 participants with identified learning difficulties.

The second reason relating to the double deficit is that when children are identified as having phonological difficulties, they have probably struggled with synthetic phonics for a significant period of time. For example in both School A and School B synthetic phonics instruction begins in Reception. It is only when they reach Year One and the child still has difficulty in applying phonemic understanding that concerns are raised by teachers and SEN practitioners. This, however, has resulted in a year of distress for the child. In my experience, when children are identified they sometimes receive an intervention which requires them either to receive 1:1 support where the same synthetic phonic material is reinforced to 'repeat' the lesson, or the child receives extra synthetic phonic material as a 'booster'. I question whether there is real benefit in insisting on following a scheme which has already shown itself to be not very useful. If the synthetic phonics scheme has not worked so far, where is the evidence to suggest that delivering the same material in a different format will make any difference? Suggate (2014: 96) writes about this in his meta-analysis of phonics interventions by writing that booster interventions were not matched with large effects. Suggate concludes that, "booster interventions should contain a different approach [to phonics instruction]." Ultimately, the phonemic approach does not

work very well at all levels. The phonological development of some children does not follow the same path (Abbott et al., 2016) which means that there will be moments in a child's development when a different approach would be more suitable (Goswami and Bryant, 1990; Nicolson, 2017).

Brain studies support this view. When children begin reading, the area in the brain with most activation is the left temporal parietal cortex. This is the area of the brain most associated with phonological processing. However, activation in this area of the brain then reduces and moves to the left ventral occipital temporal cortex which is where sight reading occurs (Nicolson, 2017). What makes this understanding so valuable is that just because an intervention supports one area of phonological processing, does not mean it will automatically transfer to syllable understanding (Van der Mark et al. 2009). In other words, syllable awareness needs to be taught, especially for some children, such as those who find reading and spelling challenging. Ultimately, I feel we should question standard practice and acknowledge that there are some occasions when a different approach would be more suitable and this is where syllables can be useful. This ties in directly with the arguments made in the previous section outlining that focusing on larger chunks in words makes it easier to segment and decode polysyllabic words.

It is important, however, to highlight the fact that research in this field can be conflicting. 25 years ago Cary and Verhaeghe (1994) carried out research comparing the respective benefits of phonemic and supra-phonemic instruction. They concluded that progress in phonemic understanding only occurred in the group which had been taught phonemic skills. The group who had concentrated on syllable understanding showed no progress in their study. Not only do some scholars see a phonemic understanding of words as desirable (Engen and Høien, 2002; Hatcher et al., 2004), scholars such as Snowling (2001: 95) also state that a reliance on larger orthographic units can have a detrimental effect on an individual's spelling progression:

> "*[…] if dyslexic readers continue to read using large orthographic units, not only will their non-word reading suffer but also their phonological representations will tend to remain global rather than becoming segmental in form*."

This criticism by Snowling is important. If children focus on larger chunks, how will they successfully decode an unfamiliar non-word such as ‘sowperful’? Her concern is that unless they focus on the individual phonemes (s.ow.p.er.f.u.l) children will not have the tools to decode the word. My argument is that whilst this is certainly an important step, we need to give children the tools to use ‘bigger chunks’ to help them succeed. This is because children who find reading and spelling difficult may struggle with reading ‘sowperful’, not because they cannot decode the sounds, but because the number of connections from print to memory are so great that the ability to retain and recall the information places too great a demand on their cognition (Cowan, 2001). In other words, the child is able to segment the phonemes, but cannot blend them together. If the child used their syllable awareness they could ‘chunk’ the word into three sections, blending each in turn (s + ow = sow / p + er = per / f + u + l = ful) thereby hopefully being more able to blend the syllables together.

2. There is a specific syllabic difficulty faced by children who find reading and spelling difficult.

As already mentioned above, syllables is not devoid of controversy and misunderstanding (Mesmer and Lake; 2020; Tarraran, 2018; Blevins, 1999). The literature surrounding dyslexia does, however, suggest that some individuals might have a specific and inherent difficulty with syllables. Twenty years ago, Hulme and Snowling (1997) shared research in which the syllable awareness of dyslexic children was assessed by comparing scores with chronological age matched controls. They discovered that dyslexic children performed less well on syllable awareness tests compared to non-dyslexic children. Their results could suggest that dyslexic children may find syllables inherently harder than ‘non-dyslexic’ children. Conversely, dyslexic children might not actually find syllables inherently harder than non-dyslexic children, and their difficulty may instead be because their rate of phonological development is slower. If the latter statement were true, however, we should expect older dyslexic children to demonstrate an improved syllable awareness.

Roughly ten years later, further research in this area has supported the idea that children with specific learning difficulties have a particular difficulty with syllables (Peterson and Pennington, 2012). Together, scholars argue that there is a link between prosodic difficulties and subsequent syllabic development (Leong and Goswami, 2014). Prosody is

concerned with parts of speech that are not individual phonemes but instead larger chunks such as syllables, and focuses on stress, through rhythm, intonation and tone. These elements are also referred to as suprasegmentals. Unlike French which is a 'syllable-timed' language, English is 'stress-timed' (Abercrombie, 1967) which means it has equal duration between stresses and greater 'vowel reduction' (change in stress etc.) (Patel and Daniele, 2003). As a result, English allows for more complex syllables (for example 'strengths' CCCVCCC) with longer consonant clusters (Patel and Daniele, 2003).

This stress-timed foundation to the English language results in rhythmic patterns developing between syllables through a combination of stressed (S for Strong) or unstressed (W for Weak) syllables. For example; *hammer* [*hæmə*] is broken into two syllables: *ham/mer*, with the rhythmic pattern of: *S/W*. This can be extended further with 'stress-feet' where polysyllabic words are broken into trochees (Leong and Goswami, 2014). For example 'helicopter' [hɛlɪkɒptə] has a syllabic structure of hel/i/cop/ter with a stress structure of s/w/s/w, or s/w/S/W to highlight the prominence of the final 'stress feet'.

Crucially, for this research, stressed syllables have a higher amplitude, longer duration and wider frequency (Cho and Hirst, 2006). As a result, strong, stressed syllables trigger segmentation of speech, whereas unstressed syllables do not (Cutler and Norris, 1988). Consequently, infants listening to speech in the pre-reading phase should develop a natural syllabic awareness from listening to the stressed and unstressed rhythm of speech (Leong and Goswami, 2014; Mehta et al., 2018; Hartas, 2006; Choi et al., 2017; Chew, 1997). Furthermore, this natural awareness of prosody and the rhythm of speech helps children to develop segmenting skills. This is through establishing boundaries between vowels (Port, 2003), which is linked to 'beat perception' associated with 'P-centres' (Leong and Goswami, 2014).

A temporal Modulation Transfer Function (tMTF) represents the ease with which a person can follow amplitude modulation (AM) (Eggermont, 2015). Research suggests that children identified with a difficulty with reading and spelling have a reduced sensitivity to detecting amplitude modulation in stressed and unstressed syllables (Mehta et al., 2018; Leong et al 2011; Holliman et al, 2008). Whilst normal entrainment would result in synchronising the external rhythm (Clayton, 2012), dyslexic individuals find the detection of speech amplitude difficult due to an impaired neural tracking of the beat fluctuations (Leong and Goswami, 2014). Peterson and Pennington (2012) highlight that these syllabic

difficulties stem from a biological origin whereby a disruption takes place in the left hemisphere affecting the language centre.

Research has shown that sensitivity to speech can have an impact on literacy development (Holliman et al., 2008). For example prefixes and suffixes which, whilst useful in building automaticity and confidence with reading and spelling (Berninger and Wolf, 2009) are almost always unstressed in English (Henderson, 1985). *Apple* [ˈæpl] (s.w), *saddle* [ˈsædl] (s.w) and *paddle* [ˈpædl] (s.w) all have a stressed first syllables (*ap-, sad-, and pad-*) with the suffixes unstressed (*-ple, dle and dle*). If, as is suggested, dyslexic individuals find detecting boundaries between stresses difficult, it could explain some of the spelling errors seen when spelling suffixes. This idea is not just reserved for suffixes and prefixes. Worthy and Invernizzi (1990: 140) and Read and Treiman (2012) all note that in experiments children have been observed to omit unstressed vowels in words, for example *ladr* for *ladder* [lædə]. Cox and Hutcheson (1988) note that there are numerous syllables that occur at the end of many English base words which are not suffixes but are nevertheless unstressed, for example *-ble*, *-tion* and *-cial*.

Fundamentally, this reduced sensitivity to the amplitude modulation causes significant difficulties for children with specific learning difficulties. Goswami et al. (2002; 10911) conclude:

> "*[...] that individual differences in sensitivity to the shape of amplitude modulation account for 25 per cent of the variance in reading and spelling acquisition.*"

Similar to Goswami, Holliman (2008) argues that the ability to do well on stress manipulation tasks accounted for much of the variance in reading level scores. For dyslexics who find the perception of *p-centres* difficult, tasks which involve tapping or counting syllables are challenging. This reduced sensitivity to stress perception has a knock on effect to further phonological understanding. As we have already explored, phonological development follows a hierarchy (Brady and Shankweiler, 2013; Treiman, 2013; Zieger and Goswami, 2005; Goswami, 2003). Consequently, if children have an innate difficulty with syllables, it is not just that they lack the tools to segment and decode polysyllabic words easily (as I put forward in arguments (1) and (2) earlier), it may also have an intrinsic ripple effect by blocking further phonic development.

I have reviewed the above literature as it exemplifies the importance for teachers to try and redress this imbalance and teach syllabification skills to children who find reading and spelling difficult. Research by Tarraran (2018) has shown that if you implement an intervention that targets training stress patterns, positive progress can be made in reading. Equally, Leong and Goswami (2014) argue that rhythmic based tasks through music combined with a syllabic element could be enormously beneficial for dyslexic individuals.

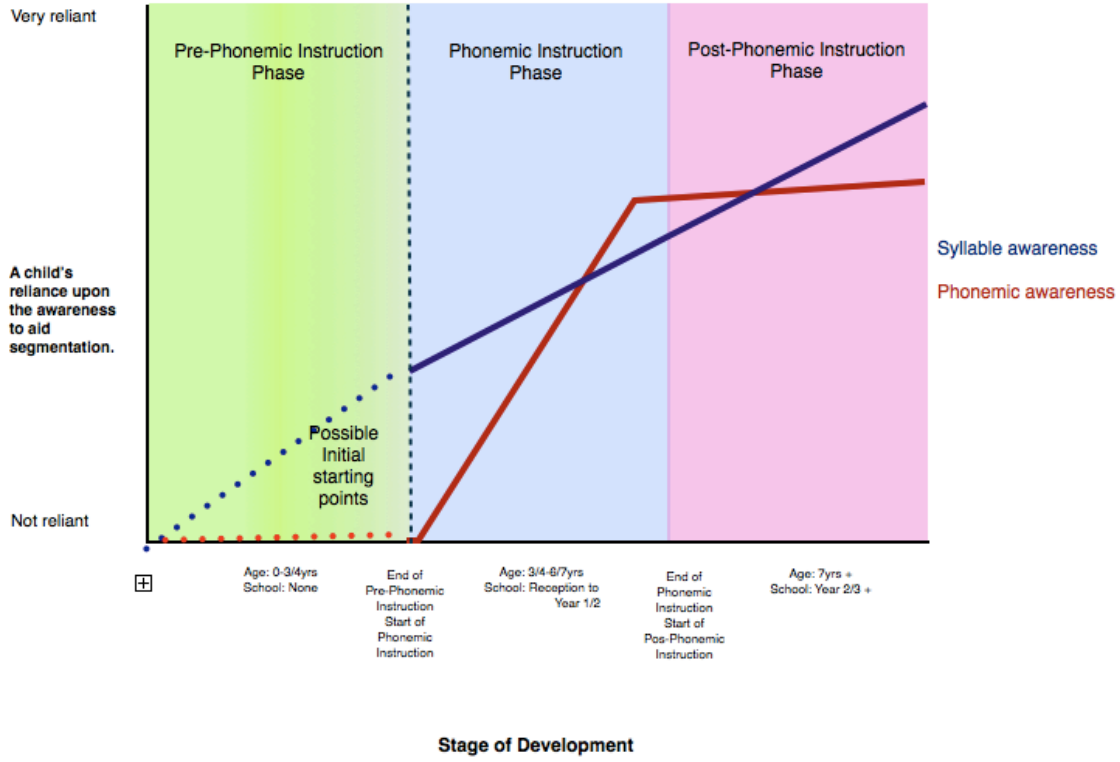
B.3.6 Concluding thoughts

To conclude, this literature review has shown how syllable segmentation could benefit the learner:

1. It reduces cognitive load by reducing the number of connections from print to memory.
2. Onset and rime patterns help the individual learn common phonetic patterns.
3. Syllable awareness is an important first step in phonetic development due to its hierarchical structure.
4. If syllable awareness develops naturally in the pre-school phase, why stop teaching it only to recommend it after phonemic instruction has taken place?

However, despite these apparent benefits, my research into syllable segmentation uncovered that it does not feature highly in many commonly used phonic programmes, nor does it feature prominently in the National Curriculum. Nevertheless, I presented Figure B. 3.4.4 (repeated below) showing perhaps the ideal relationship between syllable and phoneme instruction. In doing so, I endeavoured to argue that the best possible solution was to teach syllable awareness alongside a pre-existing synthetic phonic programme.

Figure B.3.4.4 Syllable and Phoneme Relationship - The Ideal



Adopting this approach may have a further, more specific benefit, felt by those who find reading and spelling difficult. This is either because: (1) if children are struggling to learn to read and spell with synthetic phonics, then perhaps the problem could be with synthetic phonics itself, or (2) certain individuals might have an intrinsic reduced sensitivity to detecting syllables, impacting both their use of it now as well as further phonological development.

This understanding of the far-reaching benefits of syllables helped me to create an intervention which could explore these issues further. My understanding of the importance of prosody and hierarchical structure of phonological development helped develop much of the beginning material of the intervention. My argument that syllabification could be a useful aid for decoding and segmenting prompted me to establish syllable rules which I then used to centre my teaching material within the intervention. The following sections in this thesis explore all parts of this.

Part C - Research Decision Making

(C) 1, Research Questions

Written in August 2015.

C.1 Preamble

This section was first written as part of my Registration Viva. It was important to begin my data collection with clear research questions and the Registration Viva gave me an invaluable opportunity to discuss the questions with others and edit them (if necessary). Having clear research questions before implementing an intervention is common practice (Cain, 2019) but in the lead up to forming my questions I was interested in the work of Schwalbach (2003) who notes that in qualitative research you can form research questions after initial data had been collected. Whilst my data collection involved a 'mixed methods' approach, and therefore I could have formed some of the questions after my initial pre-test data collection, I felt this would complicate the work and therefore I wanted to follow a more traditional practice of having all my questions clearly outlined before beginning the intervention (Mertler, 2017). As a result, this is one of the few sections within this thesis which has not changed much since first writing it five years ago.

C.2 The questions

Embedded within the AR framework is the need for researchers to engage in a cyclical process whereby issues are revisited and revised in a constant improvement cycle (Hine and Lavery, 2014; Stringer, 2008; Morales, 2016; Susman and Evered, 1978). By reflecting on the literature and on the research I had previously completed as part of my MSc, I was able to revise these research questions over the two years leading up to the

Registration Viva. As outlined in section A.4, the research questions for my MSc gave me a good foundation, and I wanted these research questions to build on this. The review of the literature helped me frame these questions by directing me towards specific areas of interest which were:

- Understanding how teaching syllable segmentation in my school might help children with their reading and spelling - and why this might be the case?

- Learning more about which children in my school might benefit from syllable segmentation the most. In other words, do some children find syllable segmentation harder than others - and if so why?

These two overarching aims formed the subsequent five research questions. During the various redrafting cycles, I kept the advice of Cain (2019: 126) in mind that, "Good research questions are clear, unambiguous and above all, answerable." Initially I had failed to get the balance right and had made my research questions too broad, endeavouring to explore everything. Whilst open ended questions are suitable for qualitative data collection, I needed to be more focused with my wording to enable clear quantitative data to be collected (Mertler, 2017). The final edit of my questions involved neutralising the tone of the questions to strip away any assumption on my part (Mertler, 2017). After doing all this, these were the questions I was left with:

- Question 1

  Do children in Years 1, 2 and 3 who follow a 25 week intervention programme involving syllable segmentation skills show greater reading and spelling progress than a matched group who focus only on synthetic phonic skills?

This question was the beating heart of my research and the motivation to pursue this EdD. It was supported by the three arguments I presented in section B.3.3 that: (1) Syllable segmentation reduces the connections from print to memory (cognitive load) (Wiliam, 2017; Cowan, 2001) which could help with storing words in the brain, thereby aiding reading and spelling (Tarraran, 2018; Duncan and Symour, 2003 Bhattacharya & Ehri 2004). (2) Having a greater syllabic awareness might increase the use of onset and rime patterns to help reading and spelling (Goswami and Bryant, 1990; Stackhouse and Wells,

1997; Chetail and Mathey, 2008; Glazzard, 2017). (3) As phonological development is hierarchical, it is crucial syllable awareness is developed otherwise the remaining phonological development could be impaired (Brady and Shankweiler, 2013; Treiman, 2013; Zieger and Goswami, 2005; Goswami, 2006; Leong and Goswami, 2014; Mehta et al., 2018; Hartas, 2006; Choi et al., 2017; Chew, 1997).

I was keen to have one question which sat at the centre of my research but there were two distinct parts to this question. First, before I could explore any potential relationship between syllable awareness and reading and spelling I needed to know whether it was possible to improve syllable awareness. Only then would I be able to compare this to progress data collected from pre- and post-tests in reading and spelling.

- Question 2

  Do children who have been taught syllable segmentation apply these skills to decoding and blending when reading and writing words?

I found it difficult to frame this question without assuming an outcome. I wanted to explore how children would apply the skills I would be teaching them during the intervention to their reading and spelling, but I was conscious that I could not assume that this would necessarily be the case (Mertler, 2017). Consequently, I worded the question in such a way that the answer could be that they do not apply any of the skills to reading and spelling words.

Similar to the first question, the literature I was using to frame this stemmed from: (1) syllable segmentation reduces the connections from print to memory (Wiliam, 2017; Cowan, 2001; Tarraran, 2018; Duncan and Symour, 2003 Bhattacharya & Ehri 2004), and (2) having a greater syllabic awareness might increase the use of onset and rime patterns (Goswami and Bryant, 1990; Stackhouse and Wells, 1997; Chetail and Mathey, 2008; Glazzard, 2017). Ultimately, I was interested in whether I would be able to see any evidence of this in the work they produced as an example of improved syllabic awareness.

- Question 3

  What are children's views about learning syllable segmentation? What are teachers' views about teaching syllable segmentation?

This RQ requires collecting qualitative data through analysis of interviews. Consequently, this question has an invaluable role in triangulating the quantitative analysis of RQs 1, 2 and 4. I wanted to use triangulation in an effort to help me interpret the data (Richards 2005; Schildkamp and Kuiper, 2010) but also because I accepted that no single piece of data analysis could be guaranteed without corroboration of other data sets (Cain, 2019; Cohen et al., 2011). Ultimately, this question would give me the 'best of both worlds' (Creswell, 2018) combining the statistical analysis with focused observations.

Finally, the aim of the intervention was to improve literacy development but this would be meaningless if children did not enjoy doing it and teachers could not teach it. As a KS1 teacher, it was important for me that children enjoyed the activities. I wanted it to be fun, engaging and accessible and the interviews would hopefully give me honest feedback on this. Equally, I wanted honesty from teachers. This was an important aspect of conducting a piece of AR collaboratively. The teachers were becoming one of the participants in the research and therefore an important part in the overall data analysis (Chevalier and Buckles, 2019; Anderson et al., 2007). In the literature I mentioned that one of the reasons why teachers perceive syllables as challenging is due to their own, sometimes limited, understanding of what syllables are, how they are defined and how one would go about teaching them (Duanmu, 2009; Bhattacharya and Ehri, 2004; Henderson, 1985). Consequently, I wanted to see whether this intervention had been designed effectively to mitigate this.

- Question 4

  Are there any differences between individuals or groups of children in their receptiveness to a syllable segmentation programme, according to their prior learning and any specific learning difficulty?

This final question resembled most closely the work I had begun as part of my MSc. I was particularly keen to see whether I could contribute to the growing literature that there is an innate difficulty for some children in distinguishing syllables (Peterson and Pennington,

2012; Leong and Goswami, 2014; Mehta et al., 2018; Leong et al 2011; Holliman et al, 2008). This difficulty could then have a knock on effect in subsequent literacy development.

Forming these four research questions was an important step in progressing with the AR cycle. Using the table I presented in A.3 from Kindon (2007), I saw the construction of these research questions as a tangible representation of the critical reflections to date, and a basis from which I could continue to learn as I began implementing the intervention.

(C) 2, Ontology and Epistemology

Written in June 2020.

C.2.1 Post Positivism

The remaining subsections of section C explore Research Design. Before detailing how the intervention was constructed, it is important to briefly reflect upon epistemology as it ultimately frames all subsequent research (Moon and Blackman, 2014). For example, my belief that an observable reality exists encouraged me to pursue a post-positivist approach to my research as it sits in the realist ontology with objectivist epistemology.

As the name suggests, post-positivism originally stems from the positivist tradition which asserts that one true reality exists, an idea inherited from the sciences (Anderson et al., 2007). Ontologically speaking, positivists argue that the reality is the same no matter who observes it, for example the weight of a person remains constant regardless of who measures it (Ryan, 2018). Post-positivism first broke away from positivism in the '50s and '60s due to anthropological research which centred on empowering participants (Lor, 2011). Since then it has become a legitimate alternative to positivism (Onwuegbuzie, 2000), sitting between extremes. On one end you have social constructivists where scholars, such as Gergen (2004) and Hacking (1999), argue that knowledge is situational, never objective or absolute. On the other end critical realists focus on the 'deeper dimension' (Alvesson and Skeidberg, 2009), seeking to identify the factors which create the underlying events in our world (Danermark, 2002), whilst accepting that knowledge of how reality works is not always possible (Scott, 2005). Instead, the '*Post-*' in post-positivism is the acceptance that whilst finding the true reality remains the aim of the research, it is fundamentally not possible due to the inherent fallibility of the researcher who cannot be completely objective (Tekin and Kotaman, 2013). In this respect post-positivism is similar to interpretivism, which is sometimes defined as 'anti-positivism' (Flick, 2014), in that researchers can never be separate from their own biases (Ryan, 2018).

Post-positivism, whilst situated between social constructivism and critical realism, also exists on a similar spectrum. For example realist post-positivism accepts the positivist ontology but does not accept a positivist epistemology; in other words because a true

reality exists but science is not capable of defining this perfectly, it will always be imperfectly viewed by the scientist (Gamlen and McIntyre, 2018). On the other extreme, constructivist post-positivism does not accept the ontology or epistemology of positivism and instead argues that true reality remains subjective and requires interpretation (Gamlen and McIntyre, 2018).

Due to the inherent complexity of reality and the difficulty to observe it, post-positivists have traditionally gravitated towards a pragmatist approach to their research using mixed methods (Gamlen and McIntyre, 2018; Creswell, 2018; Lor, 2011). Furthermore, in an effort to understand the reality as nearly as possible, a post-positivist approach encourages experimental designs which adhere to high degrees of validity and reliability in their research (Mertens, 2005). Setting out research in this scientific manner encourages researchers to ascertain a reality as close as possible to what they have investigated (Moore and McCabe, 1993) whilst accepting it is not perfect because it is still conditioned by the particular time or place (Tekin and Kotaman, 2013). Ultimately, the core aim of post-positivism is to, "[…] build theories that *explain* rather than just *describe* social reality (*emphasis* by original author)" (Gamlen and McIntyre, 2018: 377).

C.2.2 AR and Post-Positivism

AR is intrinsically political (Anderson et al., 2007). The word 'research' refers to challenging the way knowledge is produced within an institution, as well as the way in which it is disseminated. 'Action', on the other hand, focuses on identifying the reality: whether that requires a manipulation, for example by implementing something new into the environment (Oquist, 1978; Blum 1955) or through the critical experience of a reality (McIntyre, 2008). Whilst it has been noted by some (Ripamonti et al., 2015) that aspects of AR, such as its reflexive practice, sit within a social constructivist approach, it is commonly viewed as the 'paragon' of a post-positivist approach to research (Baskerville and Wood-Harper, 1996). Whereas positivist standards have mocked AR for a lack of impartiality and overall rigour (Anderson et al., 2007; Wann, 1953), post-positivists have embraced the AR design as a way of studying the world around them looking for an identifiable truth (Mertens, 2005).

Crucially, what separates positivists from post-positivists is that post-positivists do not claim universal generalisability. Similarly, AR maintains that any findings are tied in the situational construct in which the research took place (Mertler, 2017; Johnson, 2008). This is, however, not a reflection on the importance of the findings. AR distinguishes itself from Action Inquiry by its very aim to contribute and advance knowledge (Chevalier and Buckles, 2019). Tekin and Kotaman (2013: 89) argue the value as:

> "*Action research reports are systematic tools to use in the dissemination of useful information derived from practice. The teacher/researcher can share their experiences with their colleagues, just like doctors sharing treatment methods and tactics used in individual cases. Teachers can reach different solutions; action research enables them to publish these solutions and archive these in a systematic way. Through systematic reporting and archiving, action research provides a valuable resource for teachers. Further, action research enables the transfer of experience among teachers.*"

Furthermore, just because AR may lack generalisability, it does not mean it lacks rigour. In fact, much of the congruence between AR and post-positivism is the understanding that AR strives towards producing 'trustworthy' research through rigorous critical reflections which repeat themselves in a cyclical process. These cyclical critical reflections achieve scientific rigour by encouraging the researcher to build additional structure into their research (Baskerville and Wood-Harper, 1996) thereby building 'generality' (Kock, et a., 1997). Post-positivists epitomise this cyclical nature of AR by stating that any conclusions drawn from research are simply the beginning phase of another, subsequent, piece of research (Tekin and Kotaman, 2013).

One of the unique advantages of AR is that it allows the social reality of a setting to be studied from within (Cain, 2019; Mertler and Charles, 2011; Anderson et al., 2007). Being an 'insider' has the key benefit that the researcher is 'native' which enables a more in-depth data analysis (Tekin and Kotaman, 2013). Paradoxically, it is precisely this aspect of the design that caused it to be 'mocked' by positivist standards (Wann, 1953). And whilst post-positivism is no different to positivism in its caution that researchers are constantly at risk of influencing their research due to their own socio-cultural background and

preexisting beliefs (Reichardt and Rallis, 1994), the repeated critical reflections built in to AR mitigate this by forcing a greater degree of transparency (Griffiths, 1998).

Similar to section A.3, it is precisely these inherent cyclical reflections which have helped shape this research. AR and post-positivism do work well together and the remaining subsections of section C will hopefully make greater sense now that my approach to research has been identified.

(C) 3, Quasi Experimental Design

(and Mixed Methods)

First written in August 2016, final edit in August 2019.

C.3.1 Preamble

This subsection has been redrafted several times. It is one of the subsections within this thesis which reflects a personal growth. Following my 'registration viva', I had outlined that my knowledge of gathering quantitative and qualitative data was something I wanted to improve on. I did this, again, through a cyclical process whereby I reflected on what I wanted to achieve with the research and targeted this in my reading of the relevant literature.

In this section I briefly outline my understanding of 'quasi-experimental' design and how this works as a particular research methodology. This builds on the previous section where I discussed my ontological and epistemological perspective. I hope that this short summary will help the reader understand why I chose this design, by outlining how the key ideas from the literature, and my own preferences, influenced this decision. In short, section C will work through the list of 5Ws from Pain and colleagues (2011):

- WHAT will be done?
- WHO will be involved?
- WHERE will it take place?
- WHEN will each stage happen?
- HOW will we do this?

C.3.2 Quasi experimental design

Mertler (2017) writes that there is only one type of methodology which is able to uncover true cause and effect and that is experimental research. However, as already outlined above, post-positivist approach to research argues that these perfect laboratory conditions

do not exist in educational settings. Consequently, quasi-experimental designs are common within post-positivist approaches to research (Creswell, 2018; Lor, 2011 Mertens (2005).

The fundamental principle is that two (or more) groups, which have been exposed to different interventions, are compared on a single common measure which indicates outcome (Mertler, 2017: 100). The inherent scientific rigour, balanced by its malleability for educational settings, made it a suitable fit for my research and I found myself naturally leaning towards this structured design to measure my intervention. Cohen and colleagues (2011) explain that there are various different forms of quasi-experimental designs. The one which I felt was most appropriate for my needs was a 'pre-test-post-test non-equivalent group design'. Cohen (2011: 323) sets out the model as:

Figure C.3.2 Pre-Test-Post-Test Non-Equivalent Group Design

Experimental	O_1	X	O_2
	.....		
Control	O_3		O_4

The literature suggested that there are several advantages of adopting this particular design. First, Kumar (2005) argues that the 'pre-test-post-test' is the most effective way of measuring the effect of an intervention. This is because change can be measured by identifying the difference in the variable before and after the intervention.

Second, and somewhat linked with Kumar, the quasi-experimental design would enable the two groups to be preselected (Creswell, 2018; Johnson, 2008). Dunbar (1998) writes about this in terms of purposeful sampling with regard to researchers choosing participants to help them achieve their research aims. This approach runs contrary to randomised sampling and Cohen (2011) references this in the above model through the dotted line, indicating that the participants have been chosen. Furthermore, by making sure that I could purposefully sample the participants enabled me to construct groups with children from the same class, which consequently minimised the level of disruption and dramatically improved the ease with which it could be implemented in school (Mertler, 2017).

Third, the design recommends matching the groups at the beginning. One of the threats to validity is selection and by not randomising, researchers run the risk that participants might differ in a way which subsequently affects the dependent variable. Quasi-experimental designs try and navigate around this issue of confounding by accounting for this difference (Kenny, 2019; Kumar, 2005). The researcher uses the data from the pre-test and matches groups depending on the variable that is being investigated (Johnson, 2008). Depending on the pre-test matching scores the researcher is then faced with four options: (1) good match and continue, (2) bad match and find another group, (3) rearrange the groups until a suitable match is formed or, (4) account for the lack of matching during the analysis (Johnson, 2008). Linked to this, variables such as the quality of the delivery can be controlled as much as possible as the structure of the classes was not being altered. These were important features inherent in AR, enabling me to be a 'fly-on-the-wall' (Anderson et al., 2007) whilst also toeing the line expected from 'post-positivist' research.

Finally, a significant strength of the model is its relative simplicity, especially with regard to its ability to be incorporated into normal school practice. Pre- and post- test assessments were standard practice in both schools with September and June assessments already in place. Consequently, this intervention design fitted into the normal school practice of both schools seamlessly. The model is designed to investigate the effect which an intervention (X) has on the experimental group (O_1). This is achieved through the inbuilt pre- (O_1) and post-(O_2) tests. Since most of my research questions focused on the possible effect of a syllable intervention, this design seemed ideally suited to help me answer this.

Finally, as briefly mentioned above, AR is a knowledge forming process observing something which has been manipulated (for example introducing an intervention) (Oquist, 1978; Blum 1955). Consequently, caution must be exercised by the researcher when analysing the findings from quasi-experimental research, to be sure that it represents a true unadulterated reality (Johnson, 2008). Therefore, comparable to AR and post-positivist assumptions about research, quasi-experimental designs do not seek to generalise findings (Johnson, 2008; Mertler, 2017). Instead they contribute to a narrative of what is happening in a particular situation.

C.3.3 Mixed methods/triangulation

Post-positivists have historically used a pragmatist approach to research adopting a mixed methods approach (Creswell, 2018; Lor, 2011; Denzin, 2010; Onwuegbuzie, 2000). Long (2017) notes that 'mixed methods' has, in the last twenty years, become the 'third methodological movement' (Tashakkri and Teddlie, 2003) or the 'third research paradigm' (Johnson and Onwuegbuzie, 2004). The underlying principle being that researchers are best placed to collect data which is as close to the reality as possible by triangulating both quantitative, as well as qualitative, results (Cohen et al. 2011; Richards 2005). Mertler (2017: 12) summarises this as:

> "*[in] mixed methods research designs the combination of both types of data tends to provide better understanding of a research problem than one type of data in isolation*."

This assertion from Mertler ties back to AR, as triangulation offers a unique opportunity for the researcher to engage in more rigorous reflexivity (Creswell, 2018). In particular, concurrent triangulation, whereby the researcher collects both quantitative and qualitative data simultaneously, has the unique advantage of allowing the data to be analysed from several different angles offering many new insights (Cohen et al., 2011). Cain (2019: 27) writes that:

> "*What you need to be looking at is not just the research but the school data, the views of your teachers and students and the particular staff expertise."*

The ability to tackle my data sets from a statistical background whilst also offering me the ability to zoom in on individual case studies using a qualitative approach was an important motivation in pursuing the research as I wanted the option of building case studies. This was something I was keen to explore and I was encouraged by Bogdan and Biklen (2007) who describe case studies as a 'funnel' for one's research and Tellis (1997) who notes that you get an insight at a participant level. Ultimately, triangulating my research would give

me the ‘best of both worlds’, combining the breadth of statistical analysis with the focus of detailed observations (Creswell, 2018).

Adopting a mixed methods approach would also act as an insurance when analysing the data. Both sets of data could complement each other or provide differing insights (Schildkamp and Kuiper, 2010). This was of particular interest in understanding more about the impact of the intervention on both staff and children. I did, however, have to consider the obvious drawbacks. The literature differs regarding the importance one places on either the quantitative or qualitative approach. Depending on experience, motivation and design, the inherent balance in a triangulated approach can vary (Strauss and Corbin, 1998).

(C) 4, With whom

First written in February 2017, final edit in August 2020.

C.4.1 Who: Macro Level

> "*Teaching is not a simple matter of applying a method or using a strategy; it is a matter of human interactions within a complex network of interpretations and relationships.*"
>
> Cain, 2011

This piece of research would, in all honesty, not exist if it were not for a particular colleague: *Colleague R*. As a member of the Senior Leadership Team with a PhD herself, *Colleague R* was acutely aware of the importance of good phonological awareness in her role within the Early Years. Despite her initial help in steering me towards syllables, she was not directly involved in the research or intervention. Instead, *Colleague R* became a soundboard for me to seek advice and check decisions; something which was invaluable when engaging in such a project (Mertler, 2017). In this capacity *Colleague R* became a 'critical friend' as defined by McAteer (2013) and McNiff (2013). Her experience, both academically as well as professionally, helped to give multiple varying perspectives which I reflected upon and considered. By not being directly involved in the research I valued her impartiality (albeit relative to her initial steer towards syllables) and the perspectives she could offer.

In those early days of constructing a research design, *Colleague R* reinforced the importance working with others would play. In doing so, I needed to consider not only which staff and classes might be involved, but also which schools. This initial consideration was driven by my understanding of the literature threefold: first, from a post-positivist and pragmatist approach I wanted to understand the reality as best as I could and therefore wanted to use as many staff and classes as possible to ensure that what I was seeing was trustworthy (Creswell, 2018; Lor, 2011; Mertens, 2005). In other words, whilst I was triangulating my data on a micro-level by adopting a mixed methods approach with participants, I also wanted to triangulate my data on a macro-level by looking for patterns between schools. Second, I was encouraged by AR literature that working with

others would improve the calibre of the research (Morales, 2016; Holter and Frabutt, 2012; Clauset, et al., 2008; Anderson, 2007); this was not just in helping me question existing practice, but also in analysing the data and reaching conclusions. Finally, and perhaps most importantly, it was important to work out who I wanted to work with as they would become one of the 'participants'. This was because for my AR I did not want to conduct research 'on' but rather 'with' colleagues (Chevalier and Buckles, 2019; Anderson et al., 2007).

My initial plan was five schools, although I quickly realised that this number would be unmanageable. I settled on using two schools, one of which would be the school I work in: School A. School A is an oversubscribed selective Prep school for boys aged between 4 and 13 years old. It is located in an affluent suburb of London with a majority of working professional families and a high percentage of independent schools within the vicinity. The school considers itself forward thinking where AR is actively encouraged and embedded into the fabric of the school.

I needed to find a second school (School B) which would buy into the aims of the research and feel there was merit in being involved. From exploring similar AR projects, the easiest and perhaps most obvious solution was to use schools near to School A, but independent schools can be wary of collaborating on projects where pupil data might be collected and analysed. I felt that the competition amongst independent schools to maintain high pupil retention might inhibit their willingness to open up and work with me on this project in the way that I needed them to. Consequently I was left with two options to reflect upon:

First, I could use a local state school where a relationship could be formed with greater ease. Using a state primary school would be an excellent opportunity to analyse data from a contrasting setting, and it would raise some important questions as to whether the issues I was exploring would cross socio-economic boundaries. Conversely, the potential contrast in school setting might be so great that my research would feel disjointed. I felt my research had more to gain from working in two similar settings where I could bounce ideas off teachers who were under similar pressures, where the timetable had similar constraints and where the parental pressures with reading and spelling were similar.

Therefore, my second option was to look outside of London but find a similar school in terms of area and pupils on roll. The advantage of looking outside of London would be

that the factor of competition would be neutralised. The obvious drawback was that I intended visiting the school regularly throughout the research, and therefore had to make sure the distance was commutable.

School B presented itself organically. In a meeting with my Headmaster he encouraged me to explore a school which was part of a trisector partnership between School A and another school. This school, (School B) was in a more commutable location compared with the third school. More importantly, my Headmaster noted that the staff in School B were very similar to School A in being interested in working collaboratively on AR projects. His recommendation was fortuitous as, unbeknown to my Headmaster, a colleague from the EdD also taught in School B and so I had an easy way to begin establishing connections with the staff, which is crucial when beginning such research (Creswell, 2018).

School B is, like School A, an oversubscribed independent Prep school for boys and girls aged between 4 and 13 years old. It is located in an affluent suburb of Cambridge with a high proportion of independent schools within the vicinity. Children attending School B were mostly from working professional families and the school had recently finished AR projects which had resulted in curricular changes throughout the school.

C.4.2 Who: Micro Level

Now that I had two schools I needed to think about which staff and year groups/classes I wanted to work with. In School A I was (at the time) a Year One teacher. I was also Head of Year, a middle management role that required me to lead the other three Year One classes in curriculum and pastoral matters. I also held the role of Literacy Coordinator which similarly was a middle management role that allowed me to work with others to shape the direction of teaching across the school. Both of these middle management roles were extremely important for my credibility to persuade stakeholders, as well as participants, to work collaboratively on this piece of AR.

As mentioned in section A.3, I feel strongly that my research did not meet the criteria for PAR, despite its intrinsic motivation to work with others to bring about change. Much of

this argument centred around the fact that my research design was not being constructed democratically with participants carrying equal weight. Despite working collaboratively with staff across both schools, I was very much leading the project mostly due to the implications on their time. Another consideration was the desire to explore the importance of syllable awareness by carrying out a quasi-experiment where the intervention could be compared against a comparison group. This required me to compare classes therefore requiring almost all classes to be involved. Consequently, whilst I sought the agreement of staff if they were willing and happy to be involved, selection was ultimately driven by necessity.

After discussing the design with staff, I concluded that in School A, the research would begin in Years One and Three. First and foremost, this was influenced by my literature review and teaching experience which suggested that children in Year One would experience the 'Mini-Milestone' in literacy development moving through the 'Full Alphabetic' phase (Ehri, 2005). Year Three was where I felt polysyllabic spelling skills would manifest themselves more visibly, and this therefore also needed to form part of my research. Second, and for ethical reasons, I wanted to span two years so that there could be two 'cycles' of the intervention. Whilst this research will solely focus on cycle one, cycle two would ensure everyone finished with the same teaching input. In other words, because cycle one would see teaching divided - depending on which part of of the intervention the child received - cycle two would ensure all children caught up. This included the Year Two and Four children who took part in cycle one as well as those children who were new to Year One or Year Three, and who had yet to receive the intervention. Consequently, by choosing Year One and Year Three, by the time I got to the end of cycle two, 360 children would have been taught syllable segmentation skills in School A.

For all schools, to ensure anonymity whilst still making it easily referable for me, I decided to code the classes in the following way: School Letter: Year group number: Class number. The class number was determined depending on the order of the classroom down the corridor. In School A, Year One has four classes of 20 boys and I assigned them the codes A1.1, A1.2, A1.3 and A1.4. In Year Three there are five classes of 20 boys and I assigned the codes A3.1, A3.2, A3.3, A3.4 and A3.5. My research required 'purposeful sampling' (Teddlie and Yu, 2007; Creswell, 2018). The children that formed the two groups

were all chosen on the basis that they would remain in their already allocated classes for ease and security.

In Year One of School A, two classes (*n=40*) followed the syllable intervention and the other two classes (*n=40*) followed the synthetic phonic intervention. The four classes were initially matched on their pre-test scores. From those initial scores the two classes who were comparable in reading and spelling ability received either the syllable or synthetic phonic intervention. This allocation was done randomly by pulling the class names out of a hat. In School A, Year Three, there are five classes of 20 boys. As a result, three classes received the syllable intervention and two classes received the synthetic phonics treatment. As with Year One, the classes were initially matched on pre-test scores before being randomly allocated.

In School A, Year One, the pre-test SRT and SWST scores were used to select 12 children to form case study participants. These 12 participants comprised three children from each of the four Year One classes. The three children in each class were randomly selected from a range of top, middle and bottom participants. This was done by choosing one child from each class which met the requirements pre-determined before the intervention namely: (1) 'top' was defined as any child with a reading/spelling age 0.80 years or more above their age, (2) 'middle' was a child with a reading/spelling age equal to their age ± 0.79 years and, (3) 'bottom' was defined as any child with a reading/spelling age 0.80 years or more below their age. These were parameters commonly used in School A. Each child was given a code to ensure anonymity. The code is broken into: Child - School A Year One class number - number (1 for top, 2 for middle and 3 for bottom). Similarly, teachers were given the code: Teacher - School - Year - number.

School B is smaller than School A. There were three classes of 20 in each Year and so two classes received the synthetic phonic intervention and one class received the syllable intervention. The research was carried out in Year One and Year Two. This decision was somewhat taken out of my hands because the contact in School B was a Year Two teacher and she wanted to be involved herself. As a Year One teacher, I was interested in seeing any patterns from my observations with that in another school so we opted for Year One (for me) and Year Two (for her) as the chosen cohorts.

The intervention for all groups took place during pre-existing phonics lessons. This was to ensure that: First, the children felt at ease through familiarity and any disruption to their day was minimal. Creswell (2018) talks about this being a common approach by researchers and refers to it as 'convenience sampling' as separate groups were already preexisting. Second, both the group receiving the syllable treatment (O_1) and the synthetic phonics treatment (O_3) received a '*new*' phonic program. The addition of a phoneme or syllable segmentation component into a long-standing phonic program helped mitigate the 'Hawthorne Effect' (Snowling, 2001). The two synthetic phonic classes (O_3) continued to follow their Read Write Inc synthetic phonic structure but with an added phonemic segmentation component. The syllable groups (O_1) continued to receive a RWI synthetic phonic structure but with an added syllable segmentation component. I was encouraged by the authors of the National Reading Panel (NICHHD, 2000) who wrote that systematic phonics impacted reading progress irrespective of whether it was taught 1:1 or to the whole class. All of this will be discussed in much greater detail in subsequent sections.

To conclude I do want to raise an inescapable paradox in my work: I was drawn towards AR due to the advantage an 'insider' brings to the research in its ability to study the reality from within (Cain, 2019; Anderson et al., 2007; Mertler and Charles, 2011). I was, however, arguably an 'outsider' in the other School A classes and certainly an 'outsider' to School B. This is where my initial understanding of AR as outlined in section A.3 was so important. I understood that true PAR would have an equality through all the participants ensuring that all teachers became 'insiders'. Whilst I did not do this, I hope that it remains a piece of 'insider' research as the intervention was being implemented by the class teachers to avoid a significant deviation from the norm for the children.

This section was a brief overview of *who* was involved in the research but it will be discussed again in much greater detail in subsequent sections.

(C) 5, Timeline of research

First written in February 2017.

This thesis explores the impact of implementing an intervention over one academic year, beginning in September 2016 and finishing in July 2017. The research design accounted for a second year (cycle two) to mitigate ethical concerns inherent in quasi-experimental designs that no child is 'withheld' the intervention, simply 'delayed' (discussed in greater depth in section D). This second cycle spanned from September 2017 to July 2018. Whilst outside the scope of this thesis, in this short section I include both cycles as a way of exemplifying the long-term considerations I needed to make.

In both cycles, the intervention began and ended in line with the academic years of School A and B. This enabled me to minimise the disruption of my research for others and make it as seamless as possible to implement. Furthermore, beginning in September 2016 gave me an appropriate length of time to ensure everything was in place for me to carry out my research [11]. The summer holiday between my registration viva and the beginning of my intervention gave me an opportunity to talk to stakeholders and staff to explain how the research would take place. Below in tables C.5.1 and C.5.2 are brief summaries of the intervention cycles. The tables were crucial both personally, in being able to plan the intervention as clearly as possible but also for the school, where these tables were enlarged and printed and stuck in the staff room. The timeline became an important overview for teachers and the school leadership teams to see where we were in the intervention.

[11] In subsequent sections I discuss why I chose not to delay the start of cycle one to September 2017.

Table C.5.1 Timeline for 2016/17 with Assessment Points

	Yr 1		Yr 2	Yr 3		Yr 4
September 2016	Syllable Group DOB: 2010/2011 All children complete a baseline assessment in reading, spelling and syllable awareness. Two classes are then matched according to similar average scores. In each pair of matched classes, one would become the syllable group and one would become the synthetic phonic group. Interview a sample of boys.	Synthetic Phonic Group DOB: 2010/2011 All children complete a baseline assessment in reading, spelling and syllable awareness. Two classes are then matched according to similar average scores. In each pair of matched classes, one would become the syllable group and one would become the synthetic phonic group. Interview a sample of boys	*No action takes place*	Syllable Group DOB: 2008/2009 All children complete a baseline assessment in reading, spelling and syllable awareness. Two classes are then matched according to similar average scores. In each pair of matched classes, one would become the syllable group and one would become the synthetic phonic group.	Synthetic Phonic Group DOB: 2008/2009 All children complete a baseline assessment in reading, spelling and syllable awareness. Two classes are then matched according to similar average scores. In each pair of matched classes, one would become the syllable group and one would become the synthetic phonic group.	*No action takes place*
Michaelmas Term	Begin syllable intervention material 1.1	Begin phoneme intervention material 1.1		Begin syllable intervention material 3.1	Begin phoneme intervention material 3.1	
December 2016/January 2017	Syllable Group DOB: 2010/2011 Reassess reading, spelling and syllable awareness. (standard school practice)	Synthetic Phonic Group DOB: 2010/2011 Reassess reading, spelling and syllable awareness. (standard school practice)		Syllable Group DOB: 2008/2009 Reassess reading, spelling and syllable awareness. (standard school practice)	Synthetic Phonic Group DOB: 2008/2009 Reassess reading, spelling and syllable awareness. (standard school practice)	
Lent Term	Continue syllable intervention material 1.1	Continue phoneme intervention material 1.1		Continue syllable intervention material 3.1	Continue phoneme intervention material 3.1	
Easter 2017	Syllable Group DOB: 2010/2011 Reassess reading, spelling and syllable awareness. (standard school practice)	Synthetic Phonic Group DOB: 2010/2011 Reassess reading, spelling and syllable awareness. (standard school practice)		Syllable Group DOB: 2008/2009 Reassess reading, spelling and syllable awareness. (standard school practice)	Synthetic Phonic Group DOB: 2008/2009 Reassess reading, spelling and syllable awareness. (standard school practice)	
Trinity Term	Continue syllable intervention material 1.1 Interview a sample of boys	Continue phoneme intervention material 1.1 Interview a sample of boys		Continue syllable intervention material 3.1	Continue phoneme intervention material 3.1	

Table C.5.2 Timeline for 2017/18 with Assessment Points

	Yr 1	Yr 2		Yr 3	Yr 4	
September 2017	All Children DOB: 2011/2012 All children complete a baseline assessment in reading, spelling and syllable awareness. Interview a sample of boys	Syllable Group DOB: 2010/2011 Reassess reading, spelling and syllable awareness. (standard school practice)	Synthetic Phonic Group DOB: 2010/2011 Reassess reading, spelling and syllable awareness. (standard school practice)	All Children DOB: 2009/2010 All children complete a baseline assessment in reading, spelling and syllable awareness. (standard school practice) Interview a sample of boys	Syllable Group DOB: 2008/2009 Reassess reading, spelling and syllable awareness. (standard school practice)	Synthetic Phonic Group DOB: 2008/2009 Reassess reading, spelling and syllable awareness. (standard school practice)
Michaelmas Term	**Begin syllable intervention** material 1.1	Continue syllable intervention material 2.1	**Begin syllable intervention** material 2.2 (Catch up)	**Begin syllable intervention** material 3.2 (Catch up)	Continue syllable intervention material 4.1	**Begin syllable intervention** material 4.2 (Catch up)
December 2017/January 2018	All Children DOB: 2011/2012 Reassess reading, spelling and syllable awareness. (standard school practice)	Syllable Group DOB: 2010/2011 Reassess reading, spelling and syllable awareness. (standard school practice)	Synthetic Phonic Group DOB: 2010/2011 Reassess reading, spelling and syllable awareness. (standard school practice)	All Children DOB: 2009/2010 Reassess reading, spelling and syllable awareness. (standard school practice)	Syllable Group DOB: 2008/2009 Reassess reading, spelling and syllable awareness. (standard school practice)	Synthetic Phonic Group DOB: 2008/2009 Reassess reading, spelling and syllable awareness. (standard school practice)
Lent Term	Continue syllable intervention material 1.1	Continue syllable intervention material 2.1	Continue syllable intervention material 2.2 (Catch up)	Continue syllable intervention material 3.2 (Catch up)	Continue syllable intervention material 4.1	Continue syllable intervention material 4.2 (Catch up)
Easter 2018	All Children DOB: 2011/2012 Reassess reading, spelling and syllable awareness. (standard school practice)	Syllable Group DOB: 2010/2011 Reassess reading, spelling and syllable awareness. (standard school practice)	Synthetic Phonic Group DOB: 2010/2011 Reassess reading, spelling and syllable awareness. (standard school practice)	All Children DOB: 2009/2010 Reassess reading, spelling and syllable awareness. (standard school practice)	Syllable Group DOB: 2008/2009 Reassess reading, spelling and syllable awareness. (standard school practice)	Synthetic Phonic Group DOB: 2008/2009 Reassess reading, spelling and syllable awareness. (standard school practice)
Trinity Term	Continue syllable intervention material 1.1	Continue syllable intervention material 2.1	Continue syllable intervention material 2.2 (Catch up)	Continue syllable intervention material 3.2 (Catch up)	Continue syllable intervention material 4.1	Continue syllable intervention material 4.2 (Catch up)
June 2018	Final assessment in reading, spelling and syllable awareness Interview a sample of boys	Final assessment in reading, spelling and syllable awareness Interview a sample of boys		Final assessment in reading, spelling and syllable awareness Interview a sample of boys	Final assessment in reading, spelling and syllable awareness Interview a sample of boys	

(C) 6, Pilot work

First written in March 2017.

C.6.1 Introduction

As briefly mentioned in section A.4, I consider the MSc as a foundation upon which I built this EdD. It can, however, not be defined as 'pilot work' in the strictest sense as 'pilot work' is usually defined as a small scale trial run of the main study (Benger et al., 2016). This was not the case with the MSc, as the EdD endeavoured to improve and build upon the previous research carried out as opposed to being a feasibility study (In, 2017). I did, however, carry out pilot work in the years leading up to the intervention. This centred on designing and implementing a syllable screener which I could use as part of my pre-test-post-test batteries. Having a pilot study focusing on an assessment tool would allow me to have greater confidence in the validity of the device when it came to using it in the main study (Arnold et al., 2009; Thabane et al., 2010).

Both reading and spelling were already tracked in School A using the standardised assessments of Salford Reading Test (SRT) (2012) and Single Word Spelling Test (2002) respectively. As an independent school, phonological development was tracked internally as pupils did not complete the Phonics Screening Check (DfE, 2016). When reviewing the literature I found several examples of different syllable assessments. For example Chetail and Mathey (2008) tested syllable activation with French beginning readers by using a lexical division task in which children were asked to read bisyllabic words which were either matched or unmatched through colour. Li and colleagues (2012) and Mesmer and Lake (2020) used a syllable deletion task (SDT). Both of these tests focused heavily on using compound words, for example, "delete 'cow' in 'cowboy'".

SDTs were the most common form of assessment I could find. Bridges and Catts (2011) also used a SDT and interestingly this task became increasingly difficult as the test progressed with a total of 20 items. I was specifically interested in syllabic rules and whether teaching syllables in a sequential and systematic fashion might positively impact literacy development. To do this, I was interested in children's awareness of syllabic breaks in words and, as a result, whether improving this would make any difference. I

found an example most akin to this aim in the research of Engen and Høien (2002) who used a method of ‘syllable counting’. The teacher read words aloud to children who also had a picture. The children were then asked to mark the number of syllables for each word. This assessment was similar to what I wanted to explore but not quite, as I wanted the test to be something they could complete independently. Consequently, I set about designing my own syllable screener, but heavily influenced by all of the above syllable tests, and this section hopefully exemplifies the cyclical process of AR in the several iterations of the syllable awareness screener.

C.6.2 My MSc instrument

To understand the final syllable screener it is necessary to explain the first test I used for syllable awareness. The syllable test I devised for my MSc analysed the child’s proficiency in distinguishing syllable boundaries. The test comprised two sections with words becoming incrementally longer in syllable length, starting with two and ranging to five syllables in length. Section one comprised 25 real-polysyllabic words and section two was formed of 15 pseudo-polysyllabic words. The inclusion of pseudo words will remain a recurring theme throughout all of my pilot studies. It centres on the premise that some children will read words by sight and therefore not engage in the initial decoding processes as discussed in the literature. The Synthetic Phonic Screener (DfE, 2016) currently in use in schools adopts a similar practice and helps the teacher to focus on the decoding strategy used.

For each question four possible examples were given of how that word could be separated into syllables, and the children had to pick the example they thought was correct. Table C. 6.2 below is an example:

Table C.6.2 MSc Syllable Screener

Word	Choice A	Choice B	Choice C	Choice D
rabbit	ra-bbit	rab-bit *	rabb-it	ra-bb-it

* *In this example ‘Choice B’ is the correct answer because double consonants are split in half.*

Once I had designed the pre-test I replicated a similar version for the post-test. Cohen (2011) emphasises the importance of ensuring both tests are equal in difficulty and I achieved this by swapping the words 'like-for-like'. For example the word *handle* [hændl] (separated as han/dle) is an example of a 'consonant +le syllable' (Stone, 2012). I replaced *handle* from the pre-test with *table* [teɪbl] (separated as ta/ble). Despite the difference in the initial vowel 'a' sound, both were good examples of the 'consonant +le' syllable rule. This made the difficulty of the tests relatively identical. I also made sure that the words were similar in familiarity.

The test I devised for my MSc worked well. Just under 100 boys used the test, and they found it simple to use whilst the teachers found it easy to administer. The test did have shortcomings; of particular concern was the paradox in trying to correlate syllable awareness with literacy difficulty in a test that required children to read words. How could I be sure that the children were reading the word successfully but failing to segment it correctly into syllables, as opposed to misreading the word and therefore incorrectly segmenting it? Their poor result in the test could be attributed to misreading the words, thereby falling into a trap of 'floor effects' which is faced by many phonological performance measures (Castles and Coltheart, 2011). Furthermore, if I wanted to analyse syllable awareness from Years One to Year Three, I needed to make a test which could be administered to a child in Year One as well as Year Three. With that in mind it was clear that a version of the test was needed that did not require any words to be read by the child but still tested syllable segmentation.

C.6.3 New syllable screen: Pilot study No. 1

The first pilot test I designed was specifically for Year One children. I considered the argument put forward by Cohen et al. (2011) that boys, predominantly, prefer 'multiple choice' style questions. Although my research involved girls as well as boys, the majority of children included in this intervention would be boys (ratio of almost 1:12) which made this style of questioning appropriate. When designing this new syllable test I considered the following points:

Simplicity was important, as any test would be introduced into an already busy day. The presentation and layout were clear and neatly presented. The test focused on identifying pictures and then segmenting the word. This avoided the paradox inherent in the MSc screener that I was testing syllable awareness by asking children to read a word. The test had clear instructions at the top for teachers to follow. I ensured that a wide range of different types of syllables was included (for an overview of the different types of syllables and syllable rules please see table F.2.1 in subsection F.2.1). Consequently, I used a matrix to help make sure that different types of syllables as outlined by scholars (Snowling and Stackhouse, 2001; Stone, 2012) were represented in the test.

My first pilot test used 9 animal pictures which the child had to identify and then decide how many syllables it had. Once the child had worked out the answer they needed to circle the correct box. Table C.6.3 below is an example from the test:

Table C.6.3 Pilot Assessment No. 1

Animal	1 Syllable	2 Syllables	3 Syllables
Photo of hedgehog removed for copyright reasons. Copyright holder not know.	1 Syllable	2 Syllables	3 Syllables
Photo of cat removed for copyright reasons. Copyright holder not know.	1 Syllable	2 Syllables	3 Syllables
Photo of elephant removed for copyright reasons. Copyright holder not know.	1 Syllable	2 Syllables	3 Syllables

The test was administered to 75 boys in Year One. Before implementing the test I made sure that the pictures were all familiar to the children through a pre-test. In the pre-test I showed each picture to the class and asked them to tell me what animal it was. Every child knew each animal. When constructing the test I had to be careful which animals I chose. Animals such as *rabbit* [ræbɪt] (2 syllables), *monkey* [mʌŋki] (2 syllables) or *crocodile* [krɒkədaɪl] (3 syllables) could not be chosen as they could be falsely mistaken for

hare [heə] (1 syllable), *chimpanzee* [ˌʧɪmpənˈziː] (3 syllables) or *alligator* [ælɪgeɪtə] (4 syllables). Falsely identifying the animal would have risked making my results invalid because an incorrect response could be caused either by a lack of syllabic understanding or a correct segmentation of the wrong animal. Therefore I had to choose animals where there could be no ambiguity.

Upon reflection it was encouraging that all the children who completed the test knew what they had to do. Having said this, very few children got full marks. The pre-test showed me that all the children knew the animals, therefore an incorrect answer indicated the child did not know how to segment the word into syllables. Children who were working towards the expected reading standard in Year One also performed well in the syllable test. Similarly the children who struggled with reading found syllable segmentation difficult.

Despite the ease of administering this test, several issues required further thought: First and foremost, it was very difficult to ascertain validity in a test which I designed myself; which was also the case with the MSc test. Second, I (the assessor) had no idea whether the child knew *where* the syllable break should occur (as opposed to my MSc screener where this could be identified, thereby providing valuable data). Analysing children's understanding of syllable breaks was something I wanted to include in my research, so I needed to incorporate this. Lastly, despite working hard to ensure each animal was appropriate and could not be mistaken for another animal, I failed to think about the age of each animal. In the above example *cat* [kæt] (one syllable) could have been falsely mistaken for *kitten* [kɪtn] (two syllables). This was a valuable learning experience and I subsequently swapped the picture for a *bat* [bæt].

C.6.4 New syllable screener: Pilot study No. 2

The second pilot study required the teacher to speak each word followed by four options of how it could be segmented into syllables. The test comprised two sections. Section one required the child to identify the correct syllable chunks in nine two-syllable words. Section two required the child to identify the correct syllable in four three-syllable words. The rationale behind creating this assessment was that the child did not need to read the words which was the flaw from the MSc screener, and the assessor could analyse whether

the child knew *where* the syllable break occurred which was a flaw from the first pilot study. Table C.6.4 below is an example of the test:

Table C.6.4 Pilot Assessment No. 2

Section 1

Instructions: Your teacher will read out 10 words one at a time. Each of these words has two syllables. After saying the word your teacher will read out four ways of segmenting the word into syllables. Draw a circle around the choice where you think the word has been correctly segmented into its two syllables. The first one has been done for you in blue.

Word	Choice A	Choice B	Choice C	Choice D
goldfish	gold I fish	gol I dfish	goldfi I sh	g I oldfish
peanut	pean I ut	peanu I t	p I eanut	pea I nut
ladder	ladd I er	l I adder	lad I der	la I dder

This pilot test was administered to 20 boys in Year One. Similar to the first pilot study, the feedback from the test was encouraging as all children completed the test with no visible difficulty. On average the children scored better in this test than the other pilot test, which I elaborate on below. Children who did not perform very well in the first test also answered less questions correctly in this test.

This assessment did, however, have three significant drawbacks: First, the difficulty in saying each option convincingly. I was under no illusion that the children's improved score was a consequence of there only being one option that 'sounded right'. Whilst my other tests were not designed to trick the children and make it more complicated than it needed to be, making sure the child could identify the syllables independently was an important component. Second, the assessor cannot test pseudo words. The pseudo word component of the test I used for my MSc research gave an interesting insight into the specific difficulties of segmenting words into syllables, for example were some syllable types easier to segment than others and did that correlate with the spelling accuracy of such words? Whilst this test could have a pseudo word component, it lent itself more to using real words, because it required the assessor to read each possible option and the validity of different teachers reading pseudo words in the same way would be much harder to control. Finally, the third drawback was that it was very time intensive. Including reading the instructions, the test took nearly 20 minutes to administer which is a long time

for 15 questions. This was something which needed to be considered when moving forward as this would have to be added into an already busy timetable.

C.6.5 The EdD registration viva

The pilot studies were a crucial part of the cyclical process of AR. Although I saw similarities in the work of Engen and Høien (2002), I was glad that I had gone through the process of designing the various screeners. This is because, with each new test, I felt I had improved upon the drawbacks from the one before. Therefore, I wanted to create a syllable screener which had the best of everything and addressed the flaws in each of the previous screeners. To do this I created a test which had three parts which were incremental in difficulty. This would allow me to assess everything I wanted, and create a uniformity and consistency which was important. All of the syllable tests are in the appendix (see appendix H.5), and I have included an example of one of the tests in table C.6.5 below. As you will see, the pseudo words remain an important element of the test.

Figure C.6.5 The Final Syllable Screener

Syllable Test

Name:	
DOB:	
Class:	
Year:	
Today’s date:	

Score	/36

Instructions

For this test there are three sections.

The teacher will read the instructions for each page.

For each question circle your answer with a pencil.

If you make a mistake, cross it out and circle the new answer.

Section 1. Look at each picture and decide how many syllables it has. Circle the correct answer.

Q	Animal	1 Syllable	2 Syllables	3 Syllables	X / ✓
1	Photo of hedgehog removed for copyright reasons. Copyright holder not know.	1 Syllable	2 Syllables	3 Syllables	
2	Photo of bat removed for copyright reasons. Copyright holder not know.	1 Syllable	2 Syllables	3 Syllables	
3	Photo of elephant removed for copyright reasons. Copyright holder not know.	1 Syllable	2 Syllables	3 Syllables	
4	Photo of koala removed for copyright reasons. Copyright holder not know.	1 Syllable	2 Syllables	3 Syllables	
5	Photo of giraffe removed for copyright reasons. Copyright holder not know.	1 Syllable	2 Syllables	3 Syllables	
6	Photo of octopus removed for copyright reasons. Copyright holder not know.	1 Syllable	2 Syllables	3 Syllables	

Q	Animal	1 Syllable	2 Syllables	3 Syllables	X / ✓
7	Photo of zebra removed for copyright reasons. Copyright holder not know.	1 Syllable	2 Syllables	3 Syllables	
8	Photo of butterfly removed for copyright reasons. Copyright holder not know.	1 Syllable	2 Syllables	3 Syllables	
9	Photo of fox removed for copyright reasons. Copyright holder not know.	1 Syllable	2 Syllables	3 Syllables	
10	Photo of lion removed for copyright reasons. Copyright holder not know.	1 Syllable	2 Syllables	3 Syllables	
11	Photo of panda removed for copyright reasons. Copyright holder not know.	1 Syllable	2 Syllables	3 Syllables	
12	Photo of kangaroo removed for copyright reasons. Copyright holder not know.	1 Syllable	2 Syllables	3 Syllables	

Section 2. For each animal decide where the syllables break the word. Circle the correct answer.

Q	Animal	Option 1	Option 2	Option 3	X / ✓
1	Photo of hedgehog removed for copyright reasons. Copyright holder not know.	hedge-hog	hed-ge-hog	hed-gehog	
2	Photo of elephant removed for copyright reasons. Copyright holder not know.	elephant	el-e-phant	el-eph-ant	
3	Photo of giraffe removed for copyright reasons. Copyright holder not know.	gir-affe	gi-raf-fe	gi-raffe	
4	Photo of octopus removed for copyright reasons. Copyright holder not know.	oc-to-pus	oct-o-pus	Oc-top-us	
5	Photo of zebra removed for copyright reasons. Copyright holder not know.	ze-bra	zeb-ra	zebr-a	
6	Photo of butterfly removed for copyright reasons. Copyright holder not know.	but-ter-fly	butter-fly	butt-er-fly	

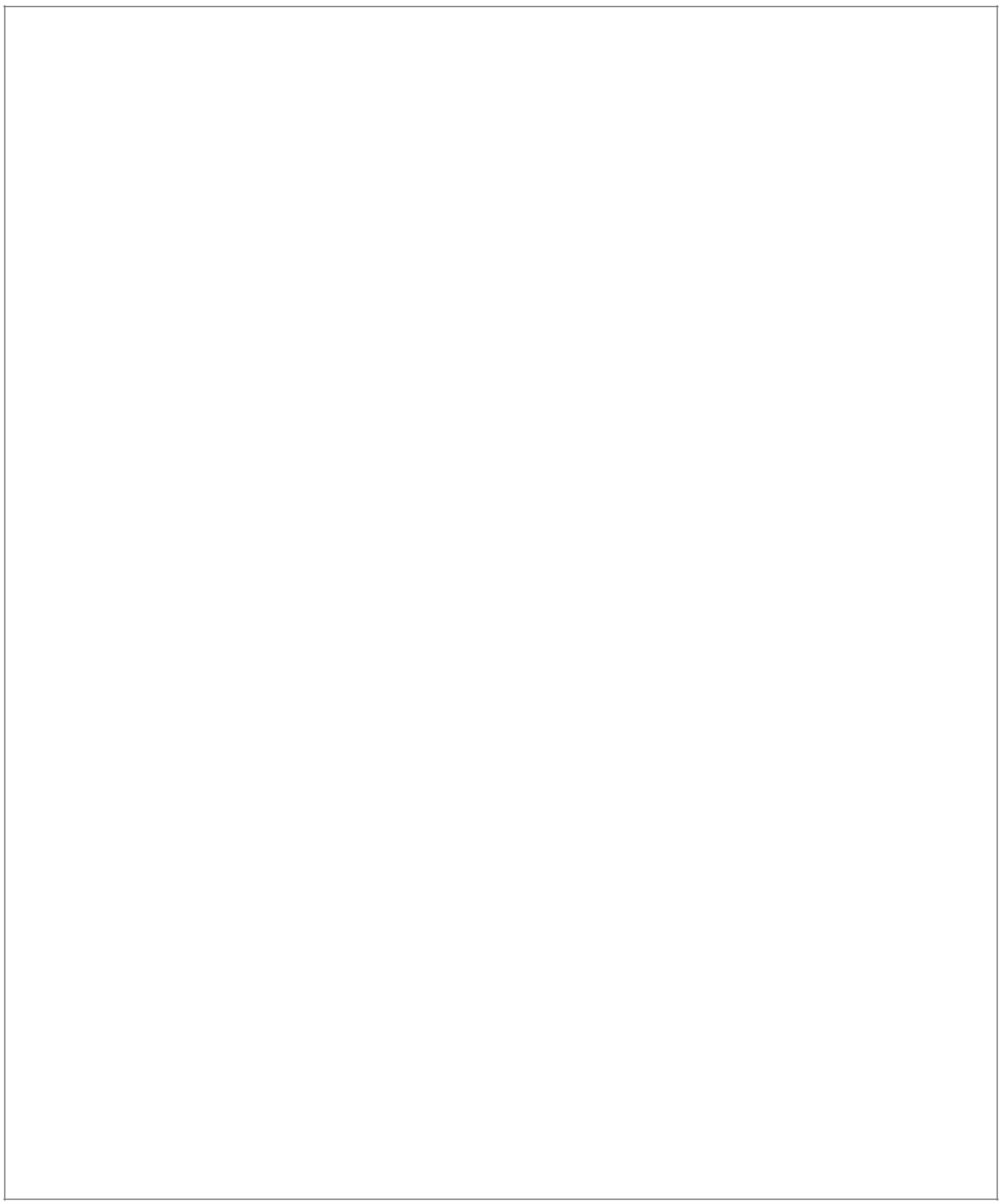
Q	Animal	Option 1	Option 2	Option 3	X / ✓
7	Photo of lion removed for copyright reasons. Copyright holder not know.	lio-n	li-on	l-ion	
8	Photo of crocodile removed for copyright reasons. Copyright holder not know.	croc-o-dile	cro-co-dile	croc-od-ile	
9	Photo of kangaroo removed for copyright reasons. Copyright holder not know.	kan-gar-oo	kang-ar-oo	kan-ga-roo	
10	Photo of koala removed for copyright reasons. Copyright holder not know.	ko-a-la	ko-ala	koal-a	
11	Photo of panda removed for copyright reasons. Copyright holder not know.	pand-a	pan-da	p-an-da	
12	Photo of rabbit removed for copyright reasons. Copyright holder not know.	ra-bbit	rab-bit	rabb-it	

Section 3. For each alien name work out where the syllable breaks the word. Circle the correct answer.

Q	Animal	Option 1	Option 2	Option 3	X / ✓
1	Photo of alien removed for copyright reasons. Copyright holder not know.	boin-king	boink-ing	boi-nking	
2	Photo of alien removed for copyright reasons. Copyright holder not know.	sawp-er	saw-per	sawper	
3	Photo of alien removed for copyright reasons. Copyright holder not know.	thight-ed	th-igh-ted	thigh-ted	
4	Photo of alien removed for copyright reasons. Copyright holder not know.	strow-ful	strowf-ul	str-ow-ful	
5	Photo of alien removed for copyright reasons. Copyright holder not know.	redi-phone	re-di-phone	red-i-phone	
6	Photo of alien removed for copyright reasons. Copyright holder not know.	blat-ter-gee	blatt-er-gee	bla-tter-gee	

Q	Animal	Option 1	Option 2	Option 3	X / ✓
7	Photo of alien removed for copyright reasons. Copyright holder not know.	lap-ir-tle	lap-irt-le	lap-i-rtle	
8	Photo of alien removed for copyright reasons. Copyright holder not know.	crain-ick	crai-nick	cr-ain-ick	
9	Photo of alien removed for copyright reasons. Copyright holder not know.	blean-ay	bl-ean-ay	blea-nay	
10	Photo of alien removed for copyright reasons. Copyright holder not know.	narpi-ly	narp-il-y	nar-pi-ly	
11	Photo of alien removed for copyright reasons. Copyright holder not know.	jairp-ool	jair-pool	jair-po-ol	
12	Photo of alien removed for copyright reasons. Copyright holder not know.	un-pun-dall	un-pund-all	unp-un-dall	

Notes



The test was printed as a five page booklet with a front page containing instructions on the inside. These instructions were read by the teacher and children together. There were then three double page sections of twelve questions. Teachers received an answer booklet so that it could be easily marked. Teachers only marked the next section if the child had scored 8 and above. This was to guard against false positives where children had guessed in the harder sections but failed to understand the concept correctly in the easier sections. This is in line with the SRT (2012) in which marking is stopped after a set number of errors.

The three different sections target three different aspects of phonics. The first, most basic assessment is to identify whether children are aware of syllables. This section required no reading skills, simply an understanding and awareness of how many syllables for each word. Furthermore, the multiple choice guides children in three options. The second section uses the same pictures and this time asks children to identify where the syllable correctly breaks. This ties in with research on 'finger-point' reading by Mesmer and Lake 2020) which I discussed in the literature review. Section three is the same as section two but uses pseudo words. I was influenced by the DfE (2016) Phonics Screening Check which also uses 'alien' words. Similar to the rationale behind the Government's test, pseudo words allowed me to see whether children understood and internalised the rule that underpinned breaking up the syllable. This was something I was interested in although I was unsure of its relative importance. Using non-words also allowed me to increase the number of words I could test (Norris and Cutler, 1988). I did heed the advice from similar experiments which used pseudo words by ensuring words conformed to English standard, for example making sure double consonants did not occur at the beginning of words (Barber et al., 2004; Li, 2012; Read and Treiman, 2013).

Regarding the images and animals, I learnt from the experience from my first pilot study (C.6.3) and avoided animals such as *rabbit* [ræbɪt] (2 syllables), *monkey* [mʌŋki] (2 syllables) or *crocodile* [krɒkədaɪl] (3 syllables) as they could be falsely mistaken for *hare* [heə] (1 syllable), *chimpanzee* [ˌʧɪmpənˈziː] (3 syllables) or *alligator* [ælɪgeɪtə] (4 syllables). Similarly, I removed *cat* [kæt] (one syllable) for it could falsely be mistaken for *kitten* [kɪtn] (two syllables).

Finally, it is perhaps worth noting that I was very much interested in the research of Bridges and Catts (2011) and dynamic assessment whereby learning potential could be

measured. Unfortunately this was not something I was able to upscale and implement for this piece of AR. This is because in their experiment incorrect responses were then countered with instruction to see whether this was a skill which could be acquired and scoring was done on a scale system. This was not feasible with 300 children but something I was nevertheless keen to explore for future phonic assessments in School A.

After each assessment in School A I collected the assessment booklets and, with feedback from staff, felt reassured that children had found it easy to complete and staff had found it simple to administer. The same test was used at each assessment point for each class. The incremental difficulty allowed Years Two and Three to use the same assessment as Year One and still get varied data in return.

C.6.6 Reliability

When we refer to 'reliability' we are interested in how accurately the results represent the truth (Mertens, 2005; Kumar, 2005). Dunbar (1998) lists two different types of errors which can affect reliability: (1) Instrument Errors, which are problems with the test itself, and (2) Pilot Errors, which are problems with the person administering the test. Mertens (2005) expands the Pilot Errors to include issues concerning participants. Due to the self-made nature of the syllable screener, it was important that I measured the reliability of the pre- and post- tests. To do this I used the Kuder-Richardson formula 21 (KR-21) as it is reported to be the most common and easily calculated formula for checking internal consistency in binary assessments where there is a right or wrong answer (Mertler, 2017).

I have listed the formula below:

$$KR\text{-}21 = \frac{(k)\ (SD^2)\ -\ \bar{x}\ (k-\bar{x})}{(SD^2)\ (k-1)}$$

k = the number of items on the test or other instruments
SD = standard deviation of total scores
$\bar{x}$ = mean of total scores

Like most tests for reliability, the result from the KR-21 formula gives an output which ranges from 0.00-1.00. A value closer to 1.00 indicates a higher internal consistency of the screener. Table C.6.6 presents the reliability of the the syllable screener for each year group, both pre- and post-tests:

Table C.6.6 Kuder-Richardson Formula 21 (KR-21)

		Pre-Test			Post-Test		
Year	*n*	M	SD	KR21	M	SD	KR21
A1	73	14.981	5.325	.83	23.658	7.465	.88
A3	89	24.978	4.575	.65	27.955	4.348	.69
B1	34	10.265	5.418	.77	19.294	3.398	.23
B2	43	16.907	5.344	.71	23.698	3.589	.38

Dunbar (1998: 140) writes that:

> "*Reliability is, conceptually, the relationship between true scores and observed scores. If the test is perfectly reliable, then the true score and the observed score will be exactly the same*."

Consequently, whilst the KR21 suggested that the syllable screener was not reliable for School B, it was above 0.5 for all other assessments indicating that the test had a good internal consistency. This was particularly true for Year One in School A.

Regarding Pilot Errors, both the SWST and SRT were standardised tests with explicit instructions at the beginning of the test to minimise any variance in how teachers administered the test. Each SWST had a script which the teacher followed, ensuring every child in every class heard the same word, used in the same sentence and repeated the same number of times. Similarly, the SRT contained passages which were standardised and similar for each comparison. Consequently, the degree of Pilot Error in both of these tests was reduced as much as possible. I used a similar format for the syllable screener by writing clear instructions which every teacher read. I also discussed how the test should be administered in staff meetings with every teacher involved in the study for Years One and Three in School A, and my contact in School B did the same. This was repeated in the week before each assessment. Finally, in terms of the participants, I timed the assessments carefully taking into account the school calendar to

make sure that assessments did not fall on a day when something more exciting was happening (for example the day Year One went on a dinosaur picnic). I also instructed all colleagues to administer the intervention in the morning, in the first lesson.

Part D - Procedures

(D) 1, Ethical considerations

First written in June 2017, final edit August 2019.

D.1.1 Preamble

Section D discusses the procedures for carrying out the intervention. Much of this will focus on the pre-test-post-test batteries. Nevertheless, I wanted to begin this section with an introductory section which would explore some of the ethical issues which I needed to consider. Some were inherent within adopting a quasi-experimental design, others resulted from conducting AR in both schools. This section will give an overview of how I approached some of these issues. For a general overview regarding this research and its adherence to ethical standards, please see H.2 in the appendix for my completed ethical grid as questions and mapped against key guidance from Cambridge University, Faculty of Education using Stutchbury and Fox (2009) and The British Educational Research Association (2011).

D.1.2 Ethical consideration: Being an 'insider'

The most important ethical consideration I needed to consider was that of being an 'insider' in my own piece of AR. Of course, as listed in section A, the main attraction of AR was that it allowed me to observe the situation within School A as a 'fly-on-the-wall' (Cain, 2019; Anderson et al., 2007). This does, however, come with the obvious limitation that my vested interest in the research could affect my ability to observe the situation with true neutrality (Waters-Adams, 2006; Hine and Lavery, 2014). It was therefore important that at the very beginning of my intervention I recognised that my drive to pursue this EdD could also be its very undoing and I had to keep this in mind throughout. I achieved this by not attempting to neutralise my views, for my argument that syllables should be an important part of phonics teaching was not the issue. It is understood that all researchers will have a

vested interest and bring a certain degree of bias to their research (Pain et al., 2012; Simons and Usher, 2000).

Instead, I focused on identifying where my biases could affect the research and ensuring that I reported truthfully the weaknesses in the research and explain how this could subsequently impact implementing, collecting and analysing the data from the intervention. The inherent cyclical reflections built into my AR design further helped me to this end and subsection F.2.2 will detail how I made these key decisions with bias in mind. Similarly, section E will go into substantive detail in how I analysed the data with a comparable aim of being transparent in order to mitigate any preconceived ideas affecting the way I portrayed the outcome of the intervention.

D.1.3 Ethical consideration: Quasi-experimental design

The second set of ethical issues I had to consider were those in adopting a quasi-experimental design. The inherent design of the experiment allows the impact of the syllable intervention to be measured by comparing the standardised scores of reading and spelling progress. Although having these two groups allowed me, as the researcher, to draw comparisons, it was an ethical concern that classes within year groups were being split and receiving different instruction. This concern was twofold: first, the intervention may have the intended impact which would, as a result, mean the comparison group miss out on teaching which could benefit their learning. Conversely, the intervention may in fact have no impact, or even cause negative progress. This would then adversely affect those children who received the intervention.

To help mitigate these concerns I first turned to the literature which suggested the intervention should not be ‘withheld’ but rather ‘delayed’ (Binik, 2019). Kellett and Nind (2005) refer to this as a ‘Multiple-Baseline Interrupted Time-Series Design’ (MBITSD). The MBITSD avoids the ethical dilemma inherent within a quasi-experimental design by ensuring children are exposed to the same material later. Consequently, I adopted this approach for my research. I proposed MBITSD to both School A and School B with the understanding that both groups would eventually receive the same intervention after one year. This did, however, raise another ethical question regarding the length of the delay

which Kellett and Nind (2005: 172) succinctly summarise:

> "*At what point does one choose between potentially greater benefits for greater numbers and probable benefits to an individual being delayed?*"

I decided to delay the intervention by one year. Whilst it might have been more ethical to shorten the delay in receiving the intervention by only one term, it would have made it very difficult to administer a parallel phonics programme and extract enough data. I needed to try, as far as possible, to maximise the length of the intervention. This was not just to give me the opportunity to collect data in regular intervals with longer gaps between them. Increasing the delay also gave teachers more time to teach the material. This was, again, a decision I had to make which balanced my dual roles as both a researcher and teacher, and involved discussing with staff collaboratively the best way forward.

Finally, there was a further benefit to delaying the intervention by one academic year in that it gave me a clearer picture of *how* I would best ensure the synthetic phonic group caught up in the second year. I anticipated some activities working better than others, and teaching the material over the course of the year helped me build the best possible programme for the second year.

By refusing to shorten the delay period I was mindful that I was potentially allowing vested interests to cloud my decision making. Whilst AR is inherently interested in solving an observable problem (Tekin and Kotaman, 2013; Morales, 2016), by potentially withholding something useful I was questioning whether the researcher was benefiting more than the researched (McDonnell et al., 2000)? I was mindful that this AR should not be to the detriment of those involved and after discussing this with stakeholders and staff we stuck with a one year delay because shortening it to one or two terms would make any comparisons much harder to measure.

D.1.4 Ethical consideration: Purposeful sampling

The third ethical consideration was choosing which children would receive which part of the intervention. As already stated, this research adopted what Teddlie and Yu (2007) defined as 'purposeful sampling'. By adopting a pre-test-post-test quasi-experimental design it is understood that the participants will be divided by the researcher (Cohen, 2011). The children remained in their pre-existing classes to minimise disruption and were matched on their pre-test scores. This was to ensure that the classes were comparable before beginning the intervention and therefore syllable awareness could be measured (this matching process is discussed in detail in section F). Subsequent allocation of classes to either treatment group was done randomly.

From my reading of quasi-experimental literature, I felt relatively comfortable about the process of matching classes. What the literature did not prepare me for was telling staff which aspect of the intervention they would be teaching. My concern centred on the assumption that everyone in School A and B knew that syllables were my area of focus. Consequently, the teachers who were assigned to the synthetic phonic part of the intervention might have felt: (1) devalued or not trusted as much as the teachers who were teaching the syllable material, (2) not as interested or excited about teaching the 'same old' phonic material. This is where the advantages of a collaborative approach to AR help with implementing the intervention. Because staff were informed and involved in the process from the beginning through regular meetings, the staff, in theory, appreciated the need for a comparison group and the inherent value of being involved irrespective of which group they were assigned to. It comes back to the idea that the 'whole is greater than the sum of its parts'. Explaining the research to staff also helped guard against any research deception (Creswell, 2018) because the aims and wishes of the interventions were clearly outlined.

D.1.5 Ethical consideration: Consent and transparency

My research, the intervention and the data I wanted to collect were not outside the field of normal practice. Nevertheless the consent for the research was granted by the school

Headmaster through 'modus operandi' [12]. In the letter sent to the Headmaster, permission was also sought to access the chosen boys' assessment data. The parents of all the children involved were informed, and I outlined the goals of the research project. Parents were invited to contact me if they had any questions or concerns.

Interviews can be sensitive and position both parties in a unique situation (Cohen, 2011; Creswell, 2018). The children who were randomly selected to be interviewed also received a letter, which briefly outlined the goals of the research and asked for consent to allow the boys to be interviewed regarding their attitudes towards spelling and reading. The interviews were recorded with an audio recording device. Both in the letter to the Headmaster, and the letter sent to the parents, it was clearly stated that participation in the interviews was optional, and that boys may decline to take part. In addition, the letters stipulated that any information collected would be made anonymous and kept in a locked environment. Finally, the information would only be seen by myself, my supervisor and assessor.

Ultimately, much of the ethical consideration before implementing the intervention centred on ensuring transparency with all participants. This was particularly important for my AR because, as mentioned in A.3 it somewhat straddled the line between a singular AR project and PAR. Whilst I was not quite following the PAR model as outlined by Pain (2011), I did want to harness the benefits of working with others and the critical multiple perspectives they could offer. Consequently, I needed to be as open as possible with colleagues so that they had all the information. Anderson and colleagues (2007: 144) summarise this well:

> "*We would suggest that part of the work of action research is keeping track of ourselves and the decisions we make in the fields we are faced with various quandaries. We would also suggest that this is probably most easily done when we commit to being transparent with other researchers or parties interested in our research*."

[12] The letter is in the appendix, H.1

(D) 2, What data did I set out to collect and why?

First written September 2017, final edit December 2019.

D.2.1 Preamble

In section C I began my overview of my intervention by working through Pain and colleagues' (2011) list of 5Ws:

- *WHAT will be done?*
- *WHO will be involved?*
- *WHERE will it take place?*
- *WHEN will each stage happen?*
- *HOW will we do this?*

This section goes into greater depth on the data I sought to collect and how I analysed it. As a result it will hopefully lay a firm foundation upon which Sections E and F can explore the process of analysing the data and engage in a critical discussion of the findings. As already mentioned, my research was a 'pre-test-post-test' design adhering to a quasi-experimental structure. The data I wanted to collect would be both quantitative and qualitative, because I wanted to triangulate my data by adopting a concurrent 'mixed methods' approach. Consequently, I begin by discussing quantitative data and the statistical tools I would use to analyse it. I then move onto discussing the qualitative data, how I recorded and transcribed the interviews.

D.2.2 Quantitative data

Part of the rationale behind adopting a quasi-experimental design was the inherent pre-test-post-test design. It was clear that I needed to collect pre-test data from all the groups and measure the progress by conducting post-tests. I deviated slightly from the traditional design by including a 'mid-test'. Whilst this was not common within the literature, there were important reasons behind it which I discuss in section F. After collecting all the data,

the book *Statistics in Psychology* by Jones (2010) guided much of my subsequent work. Whilst my first step was to share my descriptive analysis of the data with colleagues before the end of term, over the summer of 2017 I began the inferential statistical analysis for the quantitative data I had collected to answer RQs 1 and 4.

For both these questions I was interested in comparing the difference in the average progress made by the syllable and synthetic phonic groups in their syllable awareness, and comparing this to the progress made in reading and spelling.

Pre-Test-Post-Test Battery

The pre-test post-test battery comprised a Single Word Spelling Test (SWST) (NFfER, 2007), a New Salford Sentence Reading Test (SRT) (McCarty and Lallaway, 2012) and the syllable screener which I had designed. Research Question Two required additional analysis for which I used the PM Benchmark Reading Assessment (Scholastic, 2016) using the 'Miscue-Analysis' and the 'Big Write' assessment (Wilson, 2016). These are discussed in detail in section F.4 when I answer RQ2.

The SWST was part of the normal assessment procedure in Schools A and B [13]. The test was implemented twice a year (September and June) to measure and track spelling progress. The SWST assesses the spelling accuracy of 40 words which become incrementally longer and more complex. Each year group has three different tests (A, B and C) which the teacher is able to administer easily to the whole class at the same time. The teacher reads from a script which gives the word and then a sentence which includes the word. The teacher must adhere to the exact wording for consistency. The children are given a numbered answer sheet upon which to record their spellings. The test is then marked by the teacher and raw scores are converted to a standardised score which then matches to a Standard Age Score (SAS). The SAS is worked out by comparing the pupil's raw score with the national standardisation sample, taking chronological age into account. As a result the data is able to indicate how the pupil is working compared with the national average for their particular age.

[13] When implementing the intervention I used the SWST (McCarty and Lallaway, 2012) paper copy. The test was marked by hand and scores were converted. At the time of writing (2019) the SWST has been bought by GL-Assessments and moved to an online version. Consequently, detailed analysis of spelling errors and summary check lists are all produced automatically and digitally.

Similar to SWST, the SRT (McCarty and Lallaway, 2012) is a standardised reading test which is easily administered by the teacher. Unlike the SWST, the SRT is carried out 1:1 with the pupil. The child needs to read a series of sentences which involve words of incremental difficulty and complexity in length. The test finishes when the child has made his sixth error. There are instructions at the beginning which the teacher reads to ensure every child hears the same information. Finally, similar to the SWST, the teacher is able to calculate a standardised reading age from the performance in the test. The fact that both tests were standardised was important as they were intrinsically reliable forms of data and therefore a useful tool for me as a school based researcher to make important decisions. Mertler (2007: xii) summarises this view by writing:

> "*I honestly do not know anyone who loves standardised testing! But the standardised testing movement is not going away anytime soon. An examination of its impact on the country educational system over the past 40 years all confirm that. Therefore I approach it from this perspective and I strongly suggest that all professional educators adopt a similar approach. Anytime we are given the responsibility of making decisions about children we need as much information as possible in order for those decisions to be as accurate as possible.*"

The final assessment part of the pre-test-post-test battery was the syllable screener and section C discusses this in great depth as well as the calculations for reliability.

Mann-Whitney U-Test

Having collected the pre-test-post-test data in the assessments listed above, I now needed to analyse the progress made and see whether this was significant. Originally I had planned on using *t-tests* to work out the significance of my findings and match it with a *Cohen's-d* to check the effect size (Muijs, 2004). However, when I collected all the data and checked whether it met the requirements of the parametric *t-tests* (Jones, 2010) I discovered that my data was not normally distributed and skewed. I therefore needed to look at non-parametric options.

The ‘Mann-Whitney U-Test’ is considered the non-parametric equivalent of *t-tests* (Ruland, 2018; Milenković, 2011; Jones, 2010) as it allows researchers to compare two independent groups on a continuous scale that are not normally distributed (Nachar, 2008). First developed by Mann and Whitney (1947) and Wilcoxon (1945) and sometimes called the Wilcoxon-Mann-Whitney Test, it is particularly pertinent in education where you may have fewer participants within groups (5-20) thereby making it difficult to ascertain normal distribution. The Mann-Whitney U-Test is an accessible test and the output would give me an indication of significance. Furthermore, ranking data within comparisons offered me the chance to see any outliers and/or anomalies. One draw back from the Mann-Whitney U-Test is that it exaggerates the type 1 error or alpha (α) with heteroscedasticity (Nachar, 2008). In other words, the variability of the dependent variable increases as the value of the independent variable increases.

The Mann-Whitney U-Test compares the number (*n*) of observations from the first group (*x*) with that of the second group (*y*). To do this one must first rank the data. The data is then individually compared with that of equal rank in the other group. Consequently, the maximum possible paired comparisons is: *nxny*. The formula therefore presumes that if the two groups originate from the same population each rank comparison has equal chance of being larger or smaller, in other words the probability (*p*) is 1/2. This can be written as:

$$H0: p(xi > yj) = 1/2$$

and

$$H1: p(xi > yj) \neq 1\ 2$$

(*xi* is an observation of the first sample and *yi* is an observation of the second)

The Mann-Whitney U-Test rejects the null hypothesis if one group is significantly larger than the other without indicating direction (two-tailed). In a one-tailed version of the Mann-Whitney, the null hypothesis remains the same as above but because a direction is implied, this needs to be represented in the equation:

H0: p(xi>yj) = 1/2

and

H1: p(xi>yj) > 1/2

This change in the equation accounts for the fact that the first group contains larger values than the other (for example in the dependent variable). Obviously the groups can be interchanged. In short, for both the one-tailed and two-tailed versions, the null hypothesis states that the medians (θ) from the two groups are not different. This is where the Mann-Whitney U-Test differs from the parametric *t-test*, as it compares medians as opposed to mean values (Milenković, 2011). To reject the null hypothesis, one median (θ) needs to be larger than the other and the null hypothesis cannot reject it if the medians are similar:

H0: θx = θy, H1: θx < θy or θx > θy (one−tailed test)

H0: θx = θy, H1: θx ≠ θy (two−tailed test)

Nachar (2008: 15) writes that the Mann-Whitney U-Test can only be used if it meets three conditions:

> "*(a) The two investigated groups must be randomly drawn from the target population.*
> *(b) Each measurement or observation must correspond to a different participant. In statistical terms, there is independence within groups and mutual independence between groups.*
> *(c) The data measurement scale is of ordinal or continuous type. The observations values are then of ordinal, relative or absolute scale type.*"

The 'U' in Mann-Whitney U-Test implies that a U statistic for each group has been calculated. This corresponds to a statistical table which is readily available with a quick search in non-parametric literature or online. To calculate the U-Statistic:

$$Ux = nxny + ((nx(nx + 1))/ 2) - Rx \quad (1)$$

$$Uy = nxny + ((ny\ (ny + 1))/ 2) - Ry \quad (2)$$

(*R* = sum of ranks)

It is increasingly discouraged to rely on statistical significance by itself (Wasserstein and Lazar, 2016; Greenland, 2019; Hurlbert, 2018; McShane, 2019; Cohen et al., 2011). Instead, the effect size should also be reported as a 'measure of the effectiveness of the treatment' with a value closer to 1 indicating a strong effect (Cohen et al., 2011: 617). A power calculation further helps the reader by mitigating against Type II errors; namely proving significance when in fact there is none.

For all of these calculations I used online statistical packages. For the Mann-Whitney I used Social Science Statistics; www.socscistatistics.com/tests/mannwhitney to work out the U and Z values. For the effect size I used; https://lbecker.uccs.edu and power; http://onlinestatbook.com/2/calculators/power_calc.html. From having read examples of research which used Mann-Whitney I did notice variance in which values are presented in the literature. For example some present the: *n*, mean rank, sum of ranks, *U*-score, *Z*-score and *p* (Sayi and Serap, 2017) and some present the: mean, SD, *n*, *Z*-score and *p* (Hatice, 2017; Ayçiçek, 2018; Vuorela and Nummenmaa, 2004). In section F, I present the data as listed in Table D.2.2 below:

Table D.2.2 Mann-Whitney Table

	A1.1	A1,2	A1.1 & A1.2 combined	A1.3	A1.4	A1.3 & A1.4 combined
Sum of ranks:	450.5	215.5	666	521	182	703
Mean of ranks:	26.5	11.34	18.5	27.42	10.11	19
Standard Deviation:			31.56			32.91
U-value:	25.5	297.5	25.5	11	331	11
Critical value			$p < .05$ is 99 ∴ 25.5 = significant at $p < .05$.			$p < .05$ is 106 ∴ 11 = significant at $p < .05$.
Z-Score			-4.29366			4.8467
p-value <			.00001			.00001
r			.71			.79
β			.99			1.0

D.2.3 Qualitative data

As already mentioned above, I wanted to use a mixed methods approach to collecting data. I wanted to analyse a breadth of data by comparing the pre-test-post-test progress. I also wanted to triangulate these findings by interviewing participants and practitioners to get a true sense of the reality (Mertler, 2017; Cohen et al. 2011; Richards 2005). Furthermore, RQ3 specifically required an analysis of interview transcripts to gain a greater understanding of the issue with the aim to 'funnel' my research (Bogdan and Biklen, 2007) into case studies which would therefore give me a new perspective on the matter (Tellis, 1997). This section can, as a result, be broken down into three: (1) How did I prepare for the interviews? (2) How did I conduct the interviews? (3) How did I analyse the interviews?

First and foremost, Hubbard and Power (2003) note that there is value in the informal quick discussions researchers have throughout the day with participants. This involves discussing research over a coffee with staff during break-time, as well as talking to children

in the playground. Whilst not planned, they can still add value to the overall understanding of the problem at hand and how the intervention is going. This was something which I kept a record of in my research journal and will feature in section F.

Regarding formal interviews, planned as part of my pre-test-post-test design, I decided I wanted to adopt a 'group interview' approach with children as Cohen (2011) argues that interviewing more than one person at a time has several advantages. The child being interviewed would feel more at ease and therefore the responses would be more likely to be honest. Another practical advantage was that interviewing three children at a time would be faster than doing it individually. With teachers I carried out the interviews individually. This was because staff would benefit from the exact opposite: they would feel less comfortable sharing their personal feelings in a group situation and it was far less practical to interview more than one teacher because they were rarely free at the same time. For both children and teachers I decided to carry out my interviews as semi-structured. The literature suggested that ensuring all the interviews were similar in structure, both in its central theme and general questions, would help the analysis of the responses (Kumar, 2005). Furthermore, the decision to structure the interview around some central open-ended questions would ensure the necessary breadth of answers, and would still give the children an opportunity to talk freely, thereby ensuring honesty in their responses (Mertler, 2017).

The format for each interview was similar, to help ensure reliability when analysing (Cohen et al., 2011). For ethical clearance it was vital that each interview started with me outlining the purpose and that all material would be kept strictly confidential. The literature recommended using a portable audio recorder which, for ethical reasons, needed to be stored in a locked cupboard. In the appendix (H.7) I have listed the questions I used for each interview. There was a difference in the interviews between staff and children. I interviewed staff at the beginning and end of the intervention. These staff were chosen at random and were asked if they were comfortable with being interviewed. The interviews with staff were important for RQ3, but they also served an important role in giving me a holistic understanding of the situation (Tellis, 1997).

To analyse the interviews, I wanted to code the transcripts. I was heavily influenced by Glaser and Strauss (2006) and their concept of grounded theory and advocacy of a tight link between theory and data collection/analysis. As a researcher this allowed me the

freedom of not having a concrete theory in place before the intervention, enabling the theory to form itself during the research process. This lack of constraint and the ability to engage in autonomous decision making fitted well with my AR design and my area of expertise, because it enabled me to think creatively about possible themes or patterns through a constant back and forth between analysis and data collection (Sandelowski, 2000; Strauss and Corbin, 1998).

The literature indicated that there would be three main steps to coding my interviews (Creswell, 2018): (1) I would begin with ‘open coding’ or ‘topic coding’ where general categories were formed by finding patterns and themes within the transcript. (2) I would then take these themes and link them to a theoretical model in axial coding. (3) Finally, I would create a piece of meaningful analysis in selective coding. Whilst there were three stages, these should not be seen as having impermeable borders. The literature indicates that the researcher should not stop open coding to begin axial coding and vice versa. The researcher should be immersed in the analysis that fluidly exists between different types of coding. Whilst one can never fully exhaust the possible different analyses, Strauss and Corbin (1998) talk about ‘saturation’ as a term to describe the moment when the researchers feel, instinctively, that they have squeezed as much meaning from the transcription as possible.

Step one is ’open coding’ which involves fully understanding the interview through persistent reflection and asking the correct questions when reading the transcript (Rossman and Rallis, 1998). This ties back to AR and the cyclical reflections built within the design to encourage researchers to critically examine that which is before them (Hire and Lavery, 2014). The obvious advantage of this initial open coding is that it is faster than the subsequent coding procedures and it also requires very little analytical skill, since you are simply organising words depending on what feels right (Richards, 2005). Whilst knowing ‘what feels right’ depends on the number of times one has read the transcript, the cyclical reflections inherent in AR help establish trust in the coding process (Tekin and Kotaman, 2013).

After the initial open coding, researchers should engage in axial coding whereby themes are subcategorised into ‘trees’ (Richards, 2005). By organising themes, the researcher automatically and subconsciously ascribes value to statements. Furthermore the researcher is determining the value of statements in relation to others. This comparison

exercise develops a hierarchy and begins a theory building process (Strauss and Corbin, 1998). The final step is selective coding which requires theorising the data by grouping patterns into noteworthy themes, also known as 'conceptualising' (Strauss and Corbin, 1998). For example 'writing' can conceptualise 'handwriting', 'spelling' and 'syntax'. Consequently, the researcher reduces the number of codes from three to one but the verb 'writing' also denotes action.

Below is table D.2.3 which lists the codes which I used. Whilst this will be discussed in greater detail in sections E and F, I wanted to include it in this section as it exemplifies the autonomy of collecting qualitative data compared with the Mann-Whitney U-Test with its rigid formulaic structure.

Table D.2.3 Interview Codes

Theme	Code
confidence	C0?
spelling	S=G
reading	B0<
syllable	S1L
phonic strategies	PN£
positive	++
negative	--

Coding schemes are rarely subconscious or spontaneous (Parson and Brown, 2002). The researcher must dictate what the scheme will look like and ultimately it is important that the coding scheme works for them (Birks and Mills, 2011). My scheme was influenced by Mertler (2017) who used letters to represent words, for example DESC = Description on site or CAct = Child Activity. I found that my first attempt in doing this made finding themes difficult as when I used a search function on my transcripts, it would identify every word that had any of those letters in order within the word. Consequently, I used the inclusion of symbols in each of my codes to make it easier to find and collate.

(D) 3, Validity

First written October 2019, final edit September 2020.

D.3.1 Introduction

Whilst the aim of research is to report accurate data, it is also important to understand that it is impossible to have research in education which is completely accurate (Kumar, 2005). Cain (2019) refers to school environments as ‘messy’ and therefore any research in this field must recognise the complexities of working with children who will not always behave in a predictable pattern. Consequently, terms such as ‘validity’ and ‘trustworthiness’ become even more important as a way to protect the quality of quantitative and qualitative research (Anderson et al., 2007).

The inherent cyclical nature of AR somewhat addresses these issues by encouraging the researcher to improve the rigour of their research through repeated reflections and questioning. Rigour is the collective efforts to establish truthful analysis, as well as establishing high internal and external validity (Knock et al., 1997). AR supports this by adding credibility to the findings with each repetition of the cycle. AR also encourages a mixed-methods approach which can help triangulate results and advocates ‘member checking’ and transparency (Mills, 2011).

My understanding of AR and validity centres around the seminal work of Cronback (1971: 447) who writes that: “[…] one does not validate a test, but an interpretation of data rising from a specific procedure.” In other words, the use of cyclical reflections helps the researcher improve the interpretation of the data, both before in what they put in place to improve validity but also during and after the research has been collected. More recent studies (Wolming and Wikström, 2010) support this view that, ‘one does not validate an instrument’ and go on to argue that ‘purposes or arguments for what the instrument intends to do must therefore be identified and clearly stated.’ I have endeavoured to do this in subsection D.2.2 above. Ultimately, as Long (2017: 203) writes, “For this reason, the validity of mixed methods research centres on meaning making.”

This short subsection, therefore focuses more on my understanding of internal and external validity before the intervention began and outlines a few of the steps I took to improve it. Most of the focus here will be on internal validity as, from the outset, I had no intention to generalise my findings beyond Schools A and B. I must also stress that whilst I felt it was important to include this initial understanding of validity here, I return to the issue of validity in subsection E.7 when I reflect on the shortcomings within my work.

D.3.2 Internal and external validity

> "*[…] always remember. A valid test is always reliable but a reliable test is not necessarily valid*."
>
> Mertler (2017: 156)

This quote from Mertler reminds us of the importance of looking beyond reliability. Whilst the three tests I used for my pre- and post-tests were reliable, to establish 'validity' I needed to question the extent to which the instruments were able and appropriate to measure what they were supposed to (Dunbar, 1998; Mertens, 2005; Kumar, 2005). To do this I explored: face-, content-, criterion- and construct-validity for each of the instruments.

The SWST and SRT were both commercially produced standardised testing kits designed for schools to help staff ascertain spelling and reading capabilities. Consequently the face and content validity could be considered high as the outcome from the assessments measures exactly this. Similarly, as section C.6 outlines, the syllable screener went through several iterations to improve its face validity by ensuring each question assessed only syllabification skills and improving on previous syllable tests by removing the requirement to read the words. To ensure content validity, I used a 'Specifications Matrix' (Mertens, 2005) to check that I was testing each of the nine identified syllable rules and thereby creating sufficient breadth within the tests (a table of the rules can be found in table F.2.1 in subsection F.2.1).

Together with colleagues, all three pre-test assessments were used to tentatively establish criterion validity by using the external tests (SWST and SRT) to validate the self made syllable screener (Dunbar, 1998). As the assumption was that syllable awareness and

reading and spelling proficiency were linked, RQs 1 and 4 in section E showed that children who scored below actual age reading and spelling scores, also performed poorly on the syllable screener. Conversely, children who scored highly in reading and spelling also scored well on the syllable test.

With regard to the validity of qualitative data, researchers focus on trustworthiness by avoiding being misinformed by what they believe they are seeing (Fraenkel, Wallen and Hyan, 2012) and instead reflecting on the 'credibility, transferability, dependability, and conformity' of the qualitative data collected (Mertler, 2017: 140). This involves being transparent and sharing all the intricacies of the research (credibility), as well as establishing a clear understanding of the setting (transferability), outlining any changes which may have affected the research (dependability) and remaining neutral throughout (conformity). This is further broken down into: descriptive validity which is concerned with the accuracy of the account, interpretive validity which focuses on the correct interpretation of words and behaviours, theoretical validity which explores the link to broader theory and, evaluative validity which centres on the setting being studied (Gay, 2009).

Subsection D.2.3 outlined how I strove towards reporting trustworthy data collected from the interviews. Ultimately, the aim for the data collected from interviews was never to make generalised claims. Nevertheless, to improve the trustworthiness of the research I followed the advice by Mertler (2017: 142) and instead used the interviews to supplement and triangulate the quantitative data collected. I sustained the qualitative strand of the research for a prolonged period and engaged in member checking where participants reviewed the accuracy of the findings (this was true for the staff interviews). I used my critical friend *Colleague R* in School A to help audit my research design and processes throughout the intervention. Finally, I incorporated transparency into my reporting by assessing the intervention process truthfully in sections F and G, reflecting critically on the emergent shortcomings within the research deign.

Despite the steps taken, I remained mindful of the threats to validity. Over half a century ago, Campbell and Stanley (1963) and later Cook and Campbell (1979) proposed numerous threats to internal validity (cited in Mertens, 2005). These were: (1) History, (2) Maturation, (3) Testing, (4) Instrumentation, (5) Statistical Regression, (6) Differential Selection, (7) Experimental Mortality, (8), Selection-Maturation Interaction, (9) Experimental Treatment Diffusion, (10) Compensatory Rivalry by the Control Group, (11)

Compensatory Equalisation of Treatments and, (12) Resentful Demoralisation of the Control Group. Whilst it is by no means necessary to explore each of these, a few are worth mentioning.

First, the threat of 'Testing' (3), sometimes referred to as 'Reactive Effect' (Kumar, 2005) is the assumption that by conducting a pre- and post-test children may become used to the test and therefore the progress made might simply represent an increase in confidence or/ and awareness towards the independent variable. This is somewhat linked with 'Experimental Treatment Diffusion' in that an increase in scores for the children not receiving the intervention material may be attributed to those children who do receive the material (both teachers and children) 'contaminating' them. Whilst my professional and personal assumption was that five year old children were unlikely to spend time in the playground talking about syllabic segmentation skills, I nevertheless endeavoured to check this through interviewing the children and staff who followed the synthetic phonic material (Mertens, 2005). This is reported in subsection E.5 but I was mindful that the risk of 'diffusion' remained a concern throughout the intervention.

There were two further noteworthy moments when professional requests interfered with the validity of the research. In March 2017 I was asked by the school to publish an article for a publication advising parents how they could best support their child at home with reading and spelling. The article centred on my recommendation to use a range of different synthetic and analytic phonic strategies. Consequently, at risk of 'experimental treatment diffusion' I had to request that the publishing of the article be delayed until after the 25 week intervention. Similarly, in October 2016, I spoke to all the parents in School A at a 'Curriculum Evening' discussing my proposed research. Whilst ethically important to ensure transparency, I remained mindful and reserved in outlining exactly which phonic skills I was measuring to reduce the risk of cross contamination.

Finally, my intervention was very much a piece of collaborative AR carried out by me as an 'insider' and as an 'outsider' instructing colleagues. The aim of my research was to contribute to knowledge, but not generalise findings and I was mindful of Creswell (2003: 171) who wrote:

> "*External validity threats arise when experimenters draw incorrect inferences from the sample data to other persons, other settings, and*

> *past or future situations. For example, a threat to external validity arises when the researcher generalises beyond the groups in the experiment*."

Consequently, I have made a conscious effort not to overstate any claims from the research.

Similar to the 12 threats to internal validity listed above, Mertens (2005) also lists ten threats to external validity which are: (1) Explicit Description of the Experimental Treatment, (2) Multiple-Treatment Interference, (3) The Hawthorne Effect, (4) Novelty and Disruption Effects, (5) Experimenter Effect, (6) Pre-Test Sensitisation, (7) Post-Test Sensitisation, (8) Interaction of History and Treatment Effects, (9) Measurement of the Dependent Variable and, (10) Interaction of Time of Measurement and Treatment Effects. Whilst my research was not interested in generalising claims the issue of the 'experimenter effect' was one which I discuss in section F with regard to fidelity.

(D) 4, How did I answer the RQs?

First written September 2016.

D.4.1 Preamble

Below are four tables which outline how I intended to answer each of the four Research Questions. This was, like previous sections, an integral part of my registration viva in demonstrating to the board that I was ready to undertake the intervention. Subsequently, the tables have remained an important reference point as they explain exactly what I needed to do for each RQ on one side of A4. Consequently, I felt it pertinent to include this as the final part of section D as it will serve as a foundation for section E.

D.4.2 RQ 1

Research Question	Data I collected to answer the research question		How did I analyse it?
	Type	**Instrument(s)**	
Question 1 Do children in Years 1, 2 and 3 who follow a 25 week intervention programme involving syllable segmentation skills show greater reading and spelling progress than a matched group who focus only on synthetic phonic skills?	Quantitative	Syllable Screener Independent Variable Single Word Spelling Test (SWST) Dependent Variable Salford Reading Test (SRT) Dependent Variable	*I collected the spelling and reading ages, as well as the syllable results from all participants before the intervention began (pre-test). I then collected the data again half way through the intervention. Finally, I collected the results again at the end of the intervention (post-test).* Average - *Using computer software I calculated the mean for: (i) reading age, (ii) spelling age and (iii) syllable score for both the syllable and synthetic phonic group.* - *I then compared the average improvement in syllable awareness between the synthetic phonic and syllable group.* - *I then compared the average improvement in reading and spelling between the synthetic phonic and syllable group.* Bar Graph - *I presented my descriptive statistics for the reader in the form of a bar graph.* Mann-Whitney U-Test (Ruland, 2018) - *As I wanted to compare the averages between syllable scores and reading and spelling scores I used a Mann-Whitney U-Test.*

D.4.3 RQ 2

Research Question	Data I collected to answer the research question		How did I analyse it?
	Type	**Instrument(s)**	
Question 2 Do children who have been taught syllable segmentation apply these skills to decoding and blending when reading and spelling words?	Quantitative/ Qualitative	Syllable Screener Single Word Spelling Test (SWST) Salford Reading Test (SRT) PM Benchmark Reading Assessment Big Write Assessment	Participants - *In School A, Year One 12 participants were randomly selected.* - *These participants were three from each class.* - *The three participants were a top, middle and bottom pupil.* Method - *For each child in the sample I analysed their reading (SRT) and spelling (SWST) tests in detail to extrapolate their errors. I also analysed a PM miscue analysis (which is common practice) and a piece of creative writing (Big Write).* - *In all four sources of information I categorised their mistakes as either being phonetically incorrect BUT syllabically accurate or phonetically incorrect AND syllabically incorrect.* - *For example a child reading/spelling photographs as 'potografs' would be phonetically incorrect but syllabically accurate. Alternatively a child reading/ spelling photographs as 'photgraphs' would be phonetically incorrect and syllabically incorrect.* - *I recorded these errors for each child in a table. I then demonstrated specific examples where improving syllable awareness resulted in less syllabic errors in spelling and reading.*

D.4.4 RQ 3

Research Question	Data I collected to answer the research question		How did I analyse it?
	Type	**Instrument(s)**	
Question 3 What are children's views about learning syllable segmentation? What are teacher's views about teaching syllable segmentation?	Qualitative	Semi-structured Group Interviews	Participants - *12 children were interviewed. These children were chosen dependent on their results from the pre-tests. This gave me a spread of attainment to be able to analyse the variance in effectiveness of the intervention.* - *The participants also had their spelling and reading errors analysed in greater depth (please see question 2). This allowed me to form a case study for each child. Hine and Lavery (2014: 165) write: "Case study was selected as the study design because, consistent with a symbolic interactionist approach, it attempts to bring out details "from the viewpoint of the participants".* - *Five staff who taught the syllable intervention had their post-test interview transcription coded and analysed.* Structure - *All interviews were semi-structured in that I had planned questions but they remained open-ended. This gave all participants the opportunity to talk freely thereby promoting honesty in their responses (Kumar, 2005)* Accurate Transcription (Cohen, 2011) - *I recorded all the interviews using a dictaphone (consent was obtained).* - *After the interviews I then transcribed all the recordings. To capture the 'social encounter' I identified inflections, who was speaking, pauses, silent moments, tone and emphasis. In addition I attempted to make real-time notes alongside the recording.* - *Staff were encouraged to engage in 'member checking' to ensure the interviews were an accurate reflection.* Topic Coding (Richards, 2005) - *Once all the interviews were transcribed I extracted themes (codes) from the interviews under the topics of 'reading', 'spelling', 'syllables' 'segmentation' and 'confidence'.* - *I then thematically categorised their responses so that patterns could be compared.*

D.4.5 RQ 4

Research Question	Data I collected to answer the research question		How did I analyse it?
	Type	**Instrument(s)**	
Question 4 Are there any differences between individuals or groups of children in their receptiveness to a syllable segmentation programme, according to their prior learning and any specific learning difficulty?	Quantitative	Syllable Screener	- *In both the syllable group and synthetic phonic group I identified individuals who were classed as having a specific learning difficulty with reading and spelling.* - *I identified those children by focusing on any child who had a reading or spelling age one year (or more) below their chronological age (which is the method used in school).* - *I then compared the average increase in reading, spelling and syllable awareness of all the children identified with specific learning difficulties against those children who did not have an identified specific learning difficulty within the same class.* - *I then compared the average increase in reading, spelling and syllable awareness of all the children identified with specific learning difficulties in the synthetic phonic group with those children who did not have a specific learning difficulty.* Bar Graph - *I presented my descriptive statistic results for the reader in a bar graph.* Mann-Whitney U-Test (Ruland, 2018) - *As I wanted to compare the averages between syllable scores and reading and spelling scores I used a Mann-Whitney U-Test.*
		Single Word Spelling Test (SWST)	
		Salford Reading Test (SRT)	

Part E - Building Knowledge and Understanding through Data Analysis

> "*You do not need to report every bit of data collected; this will only overwhelm your readers. Instead your goal is to describe the most meaningful trends or patterns you saw emerge from your analysis.*"
>
> Mertler (2017: 197)

(E) 1, How to read this section

First written August 2018, final edit August 2020.

This section (E) was first written in August 2018. I had initially intended on writing three distinct subsections: (1) presentation of the data (the raw findings), (2) analysis of the data (the interpretation) and, (3) discussion of the data (how this sits with the literature). As soon as I started to write these three subsections, I realised how difficult I found it to keep them separate. I found myself overlapping the subsections primarily because I was constantly reflecting on every assessment score, and so separating the discussion from the analysis felt removed from the inherent immediacy within AR. Consequently, section E is broken down into four subsections which cover each of the four RQs. Within each of these subsections I present my findings, analyse the findings and discuss the outcome. As a result these subsections in section E are able to embody the nature of AR by reflecting directly what is presented and in doing so keep a coherence for each RQ.

Finally, a note about the data presented: the dependent variables are measured in '*ages*' calculated in years and months, as well as '*above/below age scores*' again calculated in years and months. To enable me to accurately analyse the data for all dependent variables, each month equated to 0.083. For example a child who was 5 years and 2 months old would have an age of 5.167 and if their spelling age was 5 years and 4 months

it would equate to 5.333. Doing this allowed me to subtract, average and compare years and months more easily and accurately.

(E) 2, Matching classes

First written August 2016, final edit August 2020.

The first piece of data analysis I needed to carry out took place before the intervention began. Inherent within the quasi-experimental pre-test post-test non-equivalent group design was the requirement to match classes on their pre-test scores. This represented purposeful sampling (Dunbar, 1998) where the children receiving the syllable or synthetic phonic treatment could be preselected (Creswell, 2018; Johnson, 2008). Matching classes to either of these groups only took place in School A for Years One and Three. In School B, phonic classes were streamed into a top, middle and bottom set and so it was decided that only the bottom set would receive the syllable treatment. This was because of the assumption that the intervention would benefit literacy development and therefore the bottom set would be in most need. As a result, it would not be correct to refer to School B as following a pre-test post-test non-equivalent group design but I will nevertheless refer to them as ‘comparison groups'.

Returning to School A, four Year One classes and five Year Three classes were matched using their pre-test scores for the SRT and SWST as well as syllable awareness. It was important that I used a range of reliable measures (Kim and Steiner, 2016). The classes whose data were most comparable were then randomly allocated to either the syllable or the synthetic phonics group. Table E.2.1 below shows the average pre-test data for Year One in School A.

Table E.2.1 School A, Year One Pretest Average Data

			Salford Reading Age				SWST Spelling Age					Syllable Test					
	Age when starting 1st September 2016	Rank	Autumn Sept 16	Rank	Reading age minus actual age	Rank	Oct 16 Raw	Oct 16 Age	Rank	Spelling age minus actual age	Rank	Sept 16	Rank	Total Rank	Total Rank minus age	Inter.	Matched with
A1.1 Mean	5.55	4.00	6.72	1.00	1.17	1.00	14.59	5.77	3.00	0.23	2.00	11.88	2.00	13.00	9.00	Syll	A1.2
SD	0.32		2.26		2.29		7.12	1.02		1.13		4.78					
A1.2 Mean	5.60	3.00	6.52	2.00	0.92	2.00	16.21	5.98	1.00	0.38	1.00	12.47	1.00	10.00	7.00	Syn	A1.1
SD	0.27		2.44		2.41		8.13	1.36		1.33		7.63					
A1.3 Mean	5.62	1.00	6.37	4.00	0.75	4.00	14.47	5.61	4.00	-0.02	4.00	7.89	4.00	21.00	20.00	Syll	A1.4
SD	0.28		2.17		2.18		6.40	1.03		1.06		5.58					
A1.4 Mean	5.62	2.00	6.43	3.00	0.81	3.00	15.72	5.84	2.00	0.22	3.00	10.39	3.00	16.00	14.00	Syn	A1.3
SD	0.33		2.11		2.11		7.15	1.13		1.14		5.84					

For Year One School A the pre-tests indicated that A1.1 (*n = 17*) and A1.2 (*n = 19*) had the highest average reading ages in the year with 6.72 years and 6.52 years. Conversely, A1.3 (*n = 19*) and A1.4 (*n = 18*) had the lowest average reading ages for the year with 6.37 years and 6.43 years. Even when accounting for the age of each participant, classes A1.1 and A1.2 had the highest above age reading levels of 1.17 years and 0.92 years. A1.3 and A1.4 had reading ages of 0.75 and 0.81 years above their actual age.

The SWST showed that A1.1 and A1.3 had the lowest average SWST age in the year with 5.77 years and 5.61 years. Conversely, A1.2 and A1.4 had the highest average SWST age for the year with 5.98 years and 5.84 years. This changes slightly when accounting for age with A1.3 and A1.4 having the lowest spelling scores above actual age of -0.02 and 0.22 years. A1.1 and A1.2 had slightly higher above age spelling scores of 0.23 and 0.38 years. Finally, in School A in Year One both A1.1 and A1.2 scored the highest average mark on the syllable screener with 11.88 and 12.47, whilst A1.3 and A1.4 scored the lowest average mark with 7.89 and 10.39.

Similar pre-test data was collected for Year Three in School A and is presented in table E. 2.2 below.

Table E.2.2 School A, Year Three Pretest Average Data

				Salford Reading				SWST				Syllable Test					
	Age when starting 1st September 2016	Rank	Sep 2016 Age	Rank	Reading age minus actual age	Rank	Spelling Age Sept 2016	Rank	Spelling age minus actual age	Rank	Oct 16	Rank	Total Rank	Total Rank minus age	Inter.	Matched with
A3.1 Mean	7.40	5.00	9.61	4.00	2.21	4.00	8.09	4.00	0.69	3.00	25.45	2.00	22.00	17.00	Syll	A3.5
SD	0.28		1.32		1.26		1.01		1.02		3.05					
A3.2 Mean	7.63	3.00	9.90	3.00	2.27	2.00	8.53	2.00	0.91	1.00	26.94	1.00	12.00	9.00	Syll	A3.4
SD	0.32		1.18		1.04		0.86		0.75		3.96					
A3.3 Mean	7.51	4.00	9.22	5.00	1.71	5.00	7.89	5.00	0.39	5.00	23.63	5.00	29.00	25.00	Syll	*See description*
SD	0.27		1.22		1.28		1.06		1.14		4.47					
A3.4 Mean	7.65	2.00	10.10	1.00	2.45	1.00	8.53	1.00	0.87	2.00	24.35	4.00	11.00	9.00	Syn	A3.2
SD	0.30		1.10		1.05		0.80		0.74		6.72					
A3.5 Mean	7.68	1.00	9.91	2.00	2.23	3.00	8.17	3.00	0.49	4.00	24.44	3.00	16.00	15.00	Syn	A3.1
SD	0.30		1.25		1.33		0.85		0.87		3.10					

The pre-tests indicated that A3.1 (*n = 20*) and A3.3 (*n = 19*) had the lowest average reading ages in the year with 9.61 years and 9.22 years. Conversely, A3.2 (*n = 17*), A3.4 (*n = 20*) and A3.5 (*n = 16*) had the highest average reading ages for the year with 9.90

years, 10.10 years and 9.91 years respectively. This only slightly changes when accounting for the age of each participant with A.3.1 and A3.3 still having the lowest above age reading levels of 2.21 and 1.71 years. A3.4 was still the highest with an average reading age 2.45 years above the participants' age, and A3.2 and A3.5 next with 2.27 years and 2.23 years above their age.

The SWST showed that A3.1 and A3.3 again had the lowest average SWST age in the year with 8.09 years and 7.89 years. Conversely, A3.2, A3.4 and A3.5 had the highest average SWST age for the year with 8.53 years, 8.53 years and 8.17 years respectively. This does change when accounting for age with A3.2 having the highest above age spelling score of 0.91 years, A3.4 having a spelling age of 0.87 years above their age and A.3.1 having a spelling age of 0.69 years above their age. A3.5 has a spelling score 0.49 years above their age and A3.3 remained the lowest with an average above age spelling age of 0.39 years. Finally, in School A in Year Three A3.1 and A3.2 scored the highest average mark on the syllable screener with 25.45 and 26.94, whilst A3.3, A3.4 and A3.5 scored the lowest average mark with 23.63, 24.35 and 24.44 respectively.

Analysis and Discussion:

In section C, I shared the four decisions faced by the researcher when matching classes: (1) good match and continue, (2) bad match and find another group, (3) rearrange the groups until a suitable match is formed or, (4) account for the lack of matching during the analysis (Johnson, 2008). The aim during my matching process was to try and find a good match. To do this I assigned a rank position (1st, 2nd, 3rd and 4th) in how the class performed in each assessment as compared to the other classes for each piece of pre-test data. This allowed me to compute a total rank, both including and excluding the average age of the classes. The literature suggested that age can make a significant difference in reading and spelling development (Rose, 2007) therefore I was keen to account for this in the way I matched the classes.

In table E.2.1 presented above, I include these ranks for Year One in School A. When adding all the ranks, A1.1 and A1.2 were most similar with totals of 13 and 10. This was also apparent when excluding age, giving total ranks of 9 and 7. Similarly, A1.3 and A1.4 were most similar with total ranks of 21 and 16; this reduced to 20 and 14 when adjusted

for age. Consequently, I decided with colleagues in Year One School A, that A1.1 and A1.2 should be matched and A1.3 and A1.4 should be matched. I then used an online random name generator to pick which part of the intervention each of the matched classes would belong to: A1.1 would follow the syllable intervention and A1.2 the synthetic phonics intervention. In the other matched comparison A1.3 would follow the syllable intervention and A1.4 the synthetic phonics intervention. The class I taught was A1.1.

I adopted a similar process with Year Three, School A although the analysis was somewhat less straightforward. In table E.2.2 presented above I have included the rank for each score, as well as a total score including and excluding the average ages of the class. Unlike Year One, looking at the ranks for each assessment alone was not enough to discern a pattern. When looking at the totals, however, it was clear that A3.2 and A3.4 were most similar in total scores with 12 and 11 respectively, and 9 each when subtracting their age rank. Similarly, once the age rank had been excluded A3.1 and A3.5 were similar with 17 and 15 (22 and 16 with age included). A3.3 was an outlier with 29 (25 when removing age rank). This indicated that A3.3 was consistently the lowest performing class in every assessment.

First and foremost, it seemed justifiable to match A3.2 and A3.4 together as well as A3.1 and A3.5 together due to the similarities in rank totals. I did this and then used the same online random name generator to ascribe the intervention treatment. Consequently, A3.2 would receive the syllable intervention and A3.4 the synthetic phonics intervention. Similarly, A3.1 was assigned to the syllable treatment and A3.5 to the synthetic phonics intervention. Regarding A3.3, I discussed with my critical friend in School A the best way to proceed. The average scores for this class were considerably lower than any of the other classes. Furthermore, with an odd number of classes in the year, we originally considered the possibility of not including A3.3 at all in the intervention. This, however, was upon reflection unfair, both for the children who would miss out but also the member of staff who would feel devalued. As a result we decided, similar to School B, that if A3.3's scores were so low - and this intervention sought to improve literacy development - then they might benefit most from receiving the intervention. Consequently we decided to match A3.3 to both A3.4 and A3.5. In doing so I recognised that in Year one and Year Three in School A we had endeavoured to achieve a good match for each class, but I also accepted that this good match was not possible everywhere and consequently should be taken into account during the analysis (Johnson, 2008). This decision was initially taken in

partnership with my critical friend but then discussed with the entire Year Three team to ensure transparency and that each teacher knew the important role they were to play in the intervention (Hine and Laverey, 2014). This decision was also taken in Years One and Two in School B, where the bottom set in each year would receive the intervention. Consequently, whilst this would not equate to a good match, a comparison could be drawn and patterns analysed as long as the substantial difference between the groups was taken into account.

The next section (E.3) now analyses and discusses the average progress made by each class on the independent variable and any causal impact this might have on the dependent variable.

(E) 3, Research Question one

First written August 2018, final edit August 2020.

Do children in Years 1, 2 and 3 who follow a 25 week intervention programme involving syllable segmentation skills show greater reading and spelling progress than a matched group who focus only on synthetic phonic skills?

E.3.1 Introduction

RQ1 sits at the heart of my AR in the first cycle of data collecting. Chapter E.2 has already discussed the matching process which was the first step to allow me to compare the progress made between pre- and post-test data in reading and spelling. Consequently, this Chapter (E.3) is tasked with analysing and discussing the findings of the post-test data and subsequent progress made. To do this, the section is broken down into three main sections. First, before exploring the impact of the independent variable on the dependent variable, it was crucial to analyse whether syllable awareness was indeed a skill which could be improved as a result of the intervention. This would be done through comparing the pre- and post-test syllable scores. Second, the section explores whether the syllable intervention has a causal effect on reading and spelling development by analysing the progress made in the SRT and SWST. The Mann-Whitney U-Test is used to establish significance in each mean comparison.

E.3.2 Syllable awareness

Syllable awareness was measured four times in both schools in all year groups apart from Year Three in School A where syllable awareness was measured three times (section F explains the reasons behind this): (1) September 2016 to establish a baseline score and aid the matching process, (2) February 2017 just before the syllable rules were taught, (3) April 2017 just after the rules had been taught (not Year Three) and finally, (4) June 2017

as a post-test assessment to measure progress. Each of the four tests were similar in format and choice of words, including syllabic structure.

In School A in Year One (*n = 73*), the mean score in September was 10.66. This increased to 16.67 in February, 22.11 in April and 23.69 in June. The mean progress between assessments was 6.01, 5.44 and 1.58 respectively. The overall mean progress was 13.03. Table E.3.2.1 below shows the data and progress for each class.

Table E.3.2.1 School A, Year One Syllable Progress

			Syllable Assessment								
			Sept 16	Feb 17	Sept to Feb Progress	Apr 17	Feb to Apr Progress	Sept to Apr Progress	Jun 17	Apr to Jun Progress	Sept to Jun Progress
Syllables	A1.1	Mean	11.88	17.00	5.12	23.35	6.35	11.47	27.06	3.71	15.18
		SD	4.78	5.93	4.12	5.70	4.42	3.79	5.85	3.60	4.11
		SE	1.16	1.44	1.00	1.38	1.07	0.92	1.42	0.87	1.00
Synthetic	A1.2	Mean	12.47	18.11	5.63	20.05	1.95	7.58	18.00	-2.05	5.53
		SD	7.63	5.59	5.81	3.82	4.79	6.24	5.34	3.95	5.27
		SE	1.75	1.28	1.33	0.88	1.10	1.43	1.23	0.91	1.21
		Comparison	-0.59	-1.11	-0.51	3.30	4.41	3.89	9.06	5.76	9.65
Syllables	A1.3	Mean	7.89	17.84	9.95	29.53	11.68	21.63	30.37	0.84	22.47
		SD	5.58	5.41	5.34	2.78	4.83	5.68	3.27	3.34	4.80
		SE	1.28	1.24	1.22	0.64	1.11	1.30	0.75	0.77	1.10
Synthetic	A1.4	Mean	10.39	13.72	3.33	15.50	1.78	5.11	19.33	3.83	8.94
		SD	5.84	5.82	4.96	5.15	5.77	4.55	6.70	5.03	5.57
		SE	1.38	1.37	1.17	1.21	1.36	1.07	1.58	1.19	1.31
		Comparison	-2.49	4.12	6.61	14.03	9.91	16.52	11.04	-2.99	13.53
		Year One Mean	10.66	16.67	6.01	22.11	5.44	11.45	23.69	1.58	13.03

In the pre-test, A1.1 (*n = 17*) and A1.2 (*n = 18*) were above the year cohort with a mean score of 11.88 and 12.47 respectively. A1.3 (*n = 19*) and A1.4 (*n = 18*) were both lower than the year cohort mean at 7.89 and 10.39. In February 2017, the two groups teaching synthetic phonics (A1.2 and A1.4) increased their syllable scores from 10.39 to 13.72 and 12.47 to 18.11. This represented a progress in average scores of 3.33 and 5.64. Conversely, the scores for the two groups teaching syllable awareness (A1.1 and A1.3) increased from 11.88 to 17.00 and 7.89 to 17.84. This represented a progress in average scores of 5.12 and 9.95. Syllable awareness was retested in April 2017. In this assessment the scores of the two groups teaching synthetic phonics increased to 15.50

and 20.05. This represented a progress in mean scores of 5.11 (1.78 since February) and 7.58 (1.95 since February) respectively. The scores of the two groups teaching syllable awareness increased to 23.35 and 29.53. This represented a progress in average scores of 11.47 (6.35 since February) and 21.63 (11.68 since February).

Finally, in June 2017 the post-test syllable screener was administered. The syllable scores of the two groups teaching synthetic phonics were 19.33 and 18.00. This was a progress in average scores of 8.94 (*SD = 5.57*) (3.83 since April) and 5.53 (*SD = 5.27*) (-2.05 since April). The scores of the two groups teaching syllable awareness had increased to 27.06 and 30.37. This represented a progress in average scores of 15.18 (*SD = 4.11*) (3.71 since April) and 22.47 (*SD = 4.80*) (0.84 since April).

In terms of comparing the means within the matched classes, A1.1 had an average progress which was 9.65 greater than A1.2. The Mann-Whitney U-Test indicated (see table E.3.2.2 below) that the progress made by A1.1 was significant ($U = 25.5$, $p = .001$, $r = .71$). Similarly, A1.3 had an average progress which was 13.53 greater than A1.4. The Mann-Whitney U-Test indicated (see table E.3.2.2 below) that this was also significant ($U = 11$, $p = .001$, $r = .79$).

Table E.3.2.2 School A, Year One Syllable Mann-Whitney U-Test

	A1.1	A1,2	A1.1 & A1.2 combined	A1.3	A1.4	A1.3 & A1.4 combined
Sum of ranks:	450.5	215.5	666	521	182	703
Mean of ranks:	26.5	11.34	18.5	27.42	10.11	19
Standard Deviation:			31.56			32.91
U-value:	25.5	297.5	25.5	11	331	11
Critical value			p < .05 is 99 ∴ 25.5 = significant at p < .05.			p < .05 is 106 ∴ 11 = significant at p < .05.
Z-Score			-4.29366			4.8467
p-value <			.0001			.0001
r			.71			.79
β			.99			.99

Year Three collected the syllable scores in October, February and June. In October, the mean score for the cohort (*n = 92*) was 24.96. This increased to 25.70 in February and 27.97 in June. The average progress between assessments was 0.74 and 2.27 respectively. The overall average progress was 3.01. Table E.3.2.3 below shows the results:

Table E.3.2.3 School A, Year Three Syllable Progress

		Syllable Test					
		Oct 16	Feb 17	Oct to Feb progress	Jun 17	Feb to June progress	Sept to June progress
A3.2	Mean	26.94	26.71	-0.24	32.59	5.88	5.65
	SD	3.96	2.59	4.70	1.97	3.16	4.21
	SE	0.96	0.63	1.14	0.48	0.77	1.02
A3.4	Mean	24.35	26.20	1.85	25.00	-1.20	0.65
	SD	6.72	3.29	6.78	4.70	3.66	7.49
	SE	1.50	0.73	1.52	1.05	0.82	1.67
	Comparison	2.59	0.51	-2.09	7.59	7.08	5.00
A3.1	Mean	25.45	28.10	2.65	29.50	1.40	4.05
	SD	3.05	3.31	3.53	3.63	3.82	3.43
	SE	0.68	0.74	0.79	0.81	0.85	0.77
A3.5	Mean	24.44	24.94	0.50	26.44	1.50	2.00
	SD	3.10	3.13	3.08	2.76	3.10	3.74
	SE	0.77	0.78	0.77	0.69	0.77	0.94
	Comparison	1.01	3.16	2.15	3.06	-0.10	2.05
A3.3	Mean	23.63	22.56	-1.06	26.31	3.75	2.69
	SD	4.47	4.26	6.44	3.16	5.12	4.90
	SE	1.12	1.06	1.61	0.79	1.28	1.22
A3.4	Mean	24.35	26.20	1.85	25.00	-1.20	0.65
	SD	6.72	3.29	6.78	4.70	3.66	7.49
	SE	1.50	0.73	1.52	1.05	0.82	1.67
	Comparison	-0.73	-3.64	-2.91	1.31	4.95	2.04
A3.3	Mean	23.63	22.56	-1.06	26.31	3.75	2.69
	SD	4.47	4.26	6.44	3.16	5.12	4.90
	SE	1.12	1.06	1.61	0.79	1.28	1.22
A3.5	Mean	24.44	24.94	0.50	26.44	1.50	2.00
	SD	3.10	3.13	3.08	2.76	3.10	3.74
	SE	0.77	0.78	0.77	0.69	0.77	0.94
	Comparison	-0.81	-2.38	-1.56	-0.13	2.25	0.69
	Year Three Mean	24.96	25.70	0.74	27.97	2.27	3.01

A3.1 (*n = 20*) and A3.2 (*n = 17*) both had pre-test syllable scores which were above the Year Three mean of 24.96 with scores of 25.45 and 26.94. A3.3 (*n = 19*), A3.4 (*n = 20*) and A3.5 (*n = 16*) all had pre-test scores below the year group mean with scores of 23.63, 24.35 and 24.44. In February 2017 the two groups teaching synthetic phonics (A3.4 and A3.5) improved their scores from 24.35 to 26.20 and from 24.44 to 24.94. This represented a progress in mean scores of 1.85 and 0.50. The scores for the three groups teaching syllable awareness (A3.1, A3.2 and A3.3) went from 25.45 to 28.10, 26.94 to 26.71 and 23.63 to 22.56. This represented progress in average scores of 2.65, -0.24 and -1.06 respectively.

In June 2017 the final syllable scores of the two groups teaching synthetic phonics were 25.00 and 26.44. This represented a progress in average scores of 0.65 (*SD = 7.49*) (-1.20 since February) and 2.00 (*SD = 3.74*) (1.50 since February). The scores of the three groups teaching syllable awareness increased to 29.50, 32.59 and 26.31. This represented a progress in average scores of 4.05 (*SD = 3.43*) (1.40 since February), 5.65 (*SD = 4.21*) (5.88 since February) and 2.69 (*SD = 4.90*) (3.75 since February).

In terms of comparing the means within the matched classes, A3.2 had an average progress which was 5.00 greater than A3.4. The Mann-Whitney U-Test indicated that (see table E.3.2.4 below) this was significant ($U = 73.5$, $p = .003$, $r = .38$). Similarly, A3.1 had an average progress which was 2.05 greater than A3.5. The Mann-Whitney U-Test indicated (see table E.3.2.4 below) that this was not significant ($U = 103.5$, $p = .075$, $r = .27$). Finally, A3.3 was compared against A3.4 and A3.5. In both these comparisons, A3.3 made more overall progress after the 25 week intervention than A3.4 and A3.5 by scores of 2.04 and 0.69 respectively. The Mann-Whitney U-Test indicated (see table E.3.2.5 below) that both of these comparisons were not significant ($U = 113.5$, $p = .14$, $r = .38$ and $U = 114.5$, $p = .62$, $r = .08$).

Table E.3.2.4 School A, Year Three Syllable Mann-Whitney U-Test No. 1

	A3.2	A3.4	A3.2 & A3.4 combined	A3.1	A3.5	A3.1 & A3.5 combined
Sum of ranks:	419.5	283.5	703	426.5	239.5	666
Mean of ranks:	24.68	14.18	19	21.32	14.97	18.5
Standard Deviation:			32.81			31.41
U-value:	73.5	266.5	73.5	103.5	216.5	103.5
Critical value			p < .05 is 105 ∴ 73.5 = significant at p < .05.			p < .05 is 98 ∴ 103.5 = not significant at p < .05.
Z-Score			-2.92571			1.7828
p-value <			.003			.075
r			.38			.27
β			.6			.15

Table E.3.2.5 School A, Year Three Syllable Mann-Whitney U-Test No. 2

	A3.3	A3.4	A3.3 & A3.4 combined	A3.3	A3.5	A3.3 & A3.5 combined
Sum of ranks:	342.5	323.5	666	277.5	250.5	528
Mean of ranks:	21.41	16.18	18.5	17.34	15.66	16.5
Standard Deviation:			31.41			26.53
U-value:	113.5	206.5	113.5	114.5	141.5	114.5
Critical value			p < .05 is 98 ∴ 113.5 = not significant at p < .05.			p < .05 is 75 ∴ 114.5 = not significant at p < .05.
Z-Score			-1.46444			0.48996
p-value <			.14			.62
r			.16			.08
β			.15			.07

In School B, Year One measured syllable progress at identical times to School A, albeit one week ahead. Table E.3.2.6 below shows the progress made. As already mentioned, School B streamed their phonics into a ‘top, middle and bottom’ set and so the comparison

between classes cannot be defined as being ‘matched'. Instead class B1.3 received the syllable intervention as they were the lowest set and therefore identified as most in need of improving their literacy development. Nevertheless, I still compared the data between the classes.

Table E.3.2.6 School B, Year One Syllable Progress

			Syllable Assessment								
			Sept 16	Feb 17	Sept to Feb Progress	Apr 17	Feb to Apr Progress	Sept to Apr Progress	Jun 17	Apr to Jun Progress	Sept to Jun Progress
B1.3	Syllables	Mean	5.67	13.17	7.50	9.50	-3.67	3.83	17.67	8.17	12.00
		SD	1.21	3.31	3.02	3.73	4.13	3.97	2.58	3.06	2.61
		SE	0.49	1.35	1.23	1.52	1.69	1.62	1.05	1.25	1.06
B1.1	Synthetic	Mean	12.07	13.00	0.93	13.36	0.36	1.29	18.14	4.79	6.07
		SD	5.09	3.14	5.21	5.65	6.36	5.66	3.57	3.62	4.84
		SE	1.36	0.84	1.39	1.51	1.70	1.51	0.95	0.97	1.29
		Comparison	-6.40	0.17	6.57	-3.86	-4.02	2.55	-0.48	3.38	5.93
B1.3	Syllables	Mean	5.67	13.17	7.50	9.50	-3.67	3.83	17.67	8.17	12.00
		SD	1.21	3.31	3.02	3.73	4.13	3.97	2.58	3.06	2.61
		SE	0.49	1.35	1.23	1.52	1.69	1.62	1.05	1.25	1.06
B1.2	Synthetic	Mean	10.43	14.07	3.64	14.86	0.79	4.43	21.14	6.29	10.71
		SD	5.89	5.03	6.43	3.48	5.22	7.44	2.77	4.84	5.48
		SE	1.57	1.34	1.72	0.93	1.40	1.99	0.74	1.29	1.47
		Comparison	-4.76	-0.90	3.86	-5.36	-4.45	-0.60	-3.48	1.88	1.29
		Year One Mean	9.39	13.41	4.02	12.57	-0.84	3.18	18.98	6.41	9.60

In September, the mean syllable score for Year One (*n* = *34*) was 9.39. This increased to 13.41 in February,12.57 in April and 18.98 in June. The average progress between assessments was 4.02, -0.84 and 6.41 respectively. The overall average progress was 9.60.

In the pre-test, B1.1 (*n* = *14*) and B1.2 (*n* = *14*) were above the year cohort with average scores of 12.07 and 10.43. B1.3 (*n* = *6*) was lower than the year cohort mean at 5.67. In February 2017 the two groups teaching synthetic phonics (B1.1 and B1.2) increased their syllable scores from 12.07 to 13.00 and 10.43 to 14.07. This represented a progress in average scores of 0.93 and 3.64 respectively. Conversely, the score for the group teaching syllable awareness (B1.3) increased from 5.67 to 13.17 representing a progress of 7.50. Syllable awareness was retested in April 2017. In this assessment the scores of the two groups teaching synthetic phonics increased to 13.36 and 14.86. This represented

a progress in average scores of 1.29 (0.36 since February) and 4.43 (0.79 since February) respectively. The score from B1.3 in April was 9.50 representing a progress of 3.83 (-3.67 since February).

Finally, in June 2017 the post-test syllable screener was administered. The syllable scores of the two groups teaching synthetic phonics were 18.14 and 21.14. This represented a progress in average scores of 6.07 (*SD = 4.85*) (4.79 since April) and 10.71 (*SD = 5.48*) (6.29 since April). The post-test score from the syllable group in June was 17.67 which was an average progress of 12.00 (*SD = 2.61*) (8.17 since April).

In terms of comparing the means within the matched classes, B1.3 had an average progress which was 5.93 greater than B1.1. The Mann-Whitney U-Test indicated (see table E.3.2.7 below) that this progress made by B1.3 was significant ($U = 10.5$, $p = .01$, $r = .61$). Conversely, B1.3 had an average progress which was 1.29 greater than B1.2. The Mann-Whitney U-Test indicated that (see table E.3.2.7 below) this was not significant ($U = 32$, $p = .44$, $r = .14$).

Table E.3.2.7 School B, Year One Syllable Mann-Whitney U-Test

	B1.3	B1.1	B1.3 & B1.1 combined	B1.3	B1.2	B1.3 & B1.2 combined
Sum of ranks:	94.5	115.5	210	73	137	210
Mean of ranks:	15.75	8.25	10.5	12.17	9.79	10.5
Standard Deviation:			12.12			12.12
U-value:	10.5	73.5	10.5	32	52	32
Critical value			p < .05 is 17 ∴ 10.5 = significant at p < .05.			p < .05 is 17 ∴ 32 = not significant at p < .05.
Z-Score			-2.55684			-0.78355
p-value <			.01			.44
r			.61			.14
β			.698			.09

In School B, Year Two, syllable progress was measured at identical times to School B, Year One. Table E.3.2.8 below shows the progress made. Similar to Year One, Year Two also streamed their phonics into a 'top, middle and bottom' set and therefore no matching

took place on pre-test data. Instead B2.3 was the lowest set, and like B1.3, received the intervention.

Table E.3.2.8 School B, Year Two Syllable Progress

			Syllable Assessment								
			Sept 16	Feb 17	Sept to Feb Progress	Apr 17	Feb to Apr Progress	Sept to Apr Progress	Jun 17	Apr to Jun Progress	Sept to Jun Progress
B2.3	Syllables	Mean	12.07	15.71	3.64	16.86	1.14	4.79	22.50	5.64	10.43
		SD	3.79	1.86	4.05	3.57	4.62	4.58	3.57	5.06	4.89
		SE	1.01	0.50	1.08	0.95	1.24	1.22	0.95	1.35	1.31
B2.1	Synthetic	Mean	19.53	17.47	-2.07	19.33	1.87	-0.20	23.87	4.53	4.33
		SD	4.16	2.47	3.56	5.94	5.30	6.61	3.68	6.35	5.49
		SE	1.07	0.64	0.92	1.53	1.37	1.71	0.95	1.64	1.42
		Comparison	-7.46	-1.75	5.71	-2.48	-0.72	4.99	-1.37	1.11	6.10
B2.3	Syllables	Mean	12.07	15.71	3.64	16.86	1.14	4.79	22.50	5.64	10.43
		SD	3.79	1.86	4.05	3.57	4.62	4.58	3.57	5.06	4.89
		SE	1.01	0.50	1.08	0.95	1.24	1.22	0.95	1.35	1.31
B2.2	Synthetic	Mean	18.93	17.00	-1.93	20.36	3.36	1.43	24.71	4.36	5.79
		SD	4.67	2.39	2.81	5.69	4.83	5.88	3.41	5.06	4.53
		SE	1.25	0.64	0.75	1.52	1.29	1.57	0.91	1.35	1.21
		Comparison	-6.86	-1.29	5.57	-3.50	-2.21	3.36	-2.21	1.29	4.64
		Year Two Mean	16.84	16.73	-0.12	18.85	2.12	2.00	23.69	4.84	6.85

In September, the mean score for Year Two (*n = 43*) was 16.84. This decreased to 16.73 in February and then increased to18.85 in April and 23.69 in June. The average progress between assessments was -0.12, 2.12 and 4.84 respectively. The overall average progress was 6.85.

In the pre-test, B2.1 (*n = 15*) and B2.2 (*n = 14*) were both above the year cohort with average scores of 19.53 and 18.93 respectively. B1.3 (*n = 14*) was lower than the year cohort mean at 12.07. In February 2017 the two groups teaching synthetic phonics (B2.1 and B2.2) had their syllable scores fall from 19.53 to 17.47 and 18.93 to 17.00. This represented progress in average scores of -2.07 and -1.93 respectively. Conversely, the score for the group teaching syllable awareness (B2.3) increased from 12.07 to 15.71 representing progress of 3.64. Syllable awareness was retested in April 2017. In this assessment the scores of the two groups teaching synthetic phonics increased to 19.33 and 20.36. This represented a progress in average scores of -0.20 (1.87 since February)

and 1.43 (3.36 since February) respectively. The score from B2.3 in April was 16.86 representing a progress of 4.79 (1.14 since February).

Finally, in June 2017 the post-test syllable screener was administered. The syllable scores of the two synthetic phonic groups teaching synthetic phonics were 23.87 and 24.71. This represented a progress in average scores of 4.33 (*SD = 5.49*) (4.53 since April) and 5.79 (*SD = 4.53*) (4.36 since April). The post-test score from the syllable group in June was 22.50 which was an average progress of 10.43 (*SD = 4.89*) (5.64 since April).

In terms of comparing the means within the matched classes, B2.3 had an average progress which was 6.10 greater than B2.1. The Mann-Whitney U-Test indicated (see table E.3.2.9 below) that this progress made by B2.3 was significant ($U = 45$, $p = .009$, $r = .49$). Similarly, B2.3 had an average progress which was 4.64 greater than B2.2 and the Mann-Whitney U-Test indicated (see table E.3.2.9 below) that this was also significant ($U = 44$, $p = .014$, $r = .51$).

Table E.3.2.9 School B, Year Two Syllable Mann-Whitney U-Test

	B2.3	B2.1	B2.3 & B2.1 combined	B2.3	B2.2	B2.3 & B2.2 combined
Sum of ranks:	270	165	435	257	149	406
Mean of ranks:	19.29	11	15	18.36	10.64	14.5
Standard Deviation:			22.91			21.76
U-value:	45	165	45	44	152	44
Critical value			p < .05 is 59 ∴ 45 = significant at p < .05.			p < .05 is 55 ∴ 44 = significant at p < .05.
Z-Score			-2.59679			2.4582
p-value <			.009			.014
r			.49			.51
β			.58			.47

Analysis and Discussion:

When looking at the data from all year groups in both schools, interesting patterns emerge. Of initial interest was looking at 'spikes' in progress between the various assessment points. Dudley and Swaffield (2008: 116) comment that, "It is better to track progress, […] as it occurs so that teaching can be adjusted," and I was conscious throughout the 25 week intervention that the data I collected during the intervention would directly inform the second cycle. Consequently, the data from these mid-intervention assessment points might give me a specific insight into how I should structure my subsequent intervention material for the following year, and how I would continue to plan the school's phonic scheme of work as Head of Literacy.

With that in mind, the progress for the groups receiving syllable intervention in Year One School A was at its greatest between February 2017 and April 2017. This was especially noticeable when accounting for the fact that the gap between February and April was only 7 weeks and yet it accounted for more progress than the 11 weeks prior or the 7 weeks following. A1.1 made an average improvement of 6.35 (*SD = 4.42*), 4.41 more than A1.2 in these middle 7 weeks. Similarly, A1.3 made an average improvement of 11.68 (*SD = 4.83*), 9.91 more than A1.4 in the same time frame. Whilst Year Three did not complete an April assessment to allow for a comparative analysis with Year One, a closer look at the data suggested that the classes who received the syllable intervention generally made more progress in syllable awareness from February to June than from October to February. A3.2 and A3.3 made an average progress of 5.88 and 3.75 in the second half of the intervention as opposed to -0.24 and -1.06 in the first half. A3.1, however, made more progress in the first half, 2.65 versus 1.40 in the second half.

In School B, this pattern was equally visible in the second half of the assessment, but not between February and April but rather April to June. B1.3 made their biggest gain in average progress of 8.17 (*SD = 3.06*) marks between April to June. Similarly, the biggest gain in mean progress for B2.3 was also April to June with 5.64 marks (SD = *5.06*). Whilst this spike in progress runs later than the progress seen in Year One School A, I nevertheless found it helpful when reflecting on the aspects of the intervention which might be having the most impact. Whilst further research would need to be carried out to understand the issue more clearly, the data indicated that the intervention in the second

half of the year had more of a measurable impact than the first half. This might have been due to the specific activities having more of an impact, for example between February and April the intervention moved away from prosodic activities and began to focus on teaching syllabic rules. Conversely, the increase in progress seen in the second half of the year might simply be down to a delay between teaching the material and children subsequently using it. In other words, the material in the first half was equally useful, simply the benefit was not immediately transferred. This will be explored in subsequent research questions.

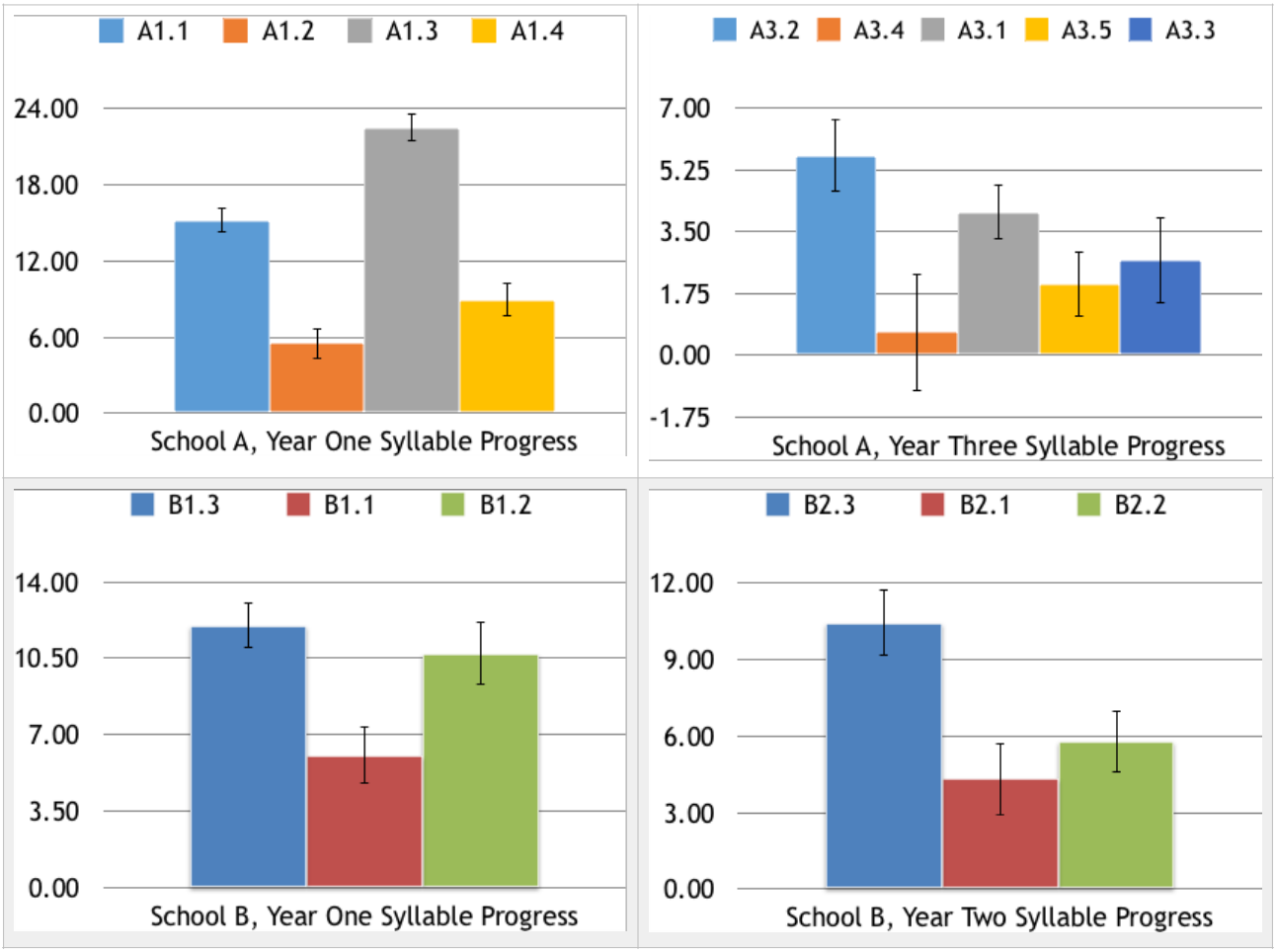
My pre-intervention assumption garnered from the literature was that syllable awareness was a cyclical skill insofar as the more you knew about it, the more you would use it. However, the data from Year One did not necessarily support this view as there was a marked decline in progress in both Year One classes between April and June. A1.1 dropped from an average progress of 6.35 marks to 3.71 marks. Equally, A1.3 dropped from an average progress of 11.68 marks to 0.84 marks. This might be explained by the fact April to June was a notoriously busy period in School A with Art Week, STEM Projects, House competitions and School Trips impacting the intervention and teaching in that final term. Equally, the drop in progress might indicate a 'saturation' reached by the children where further progress was slower.

A second observation from the syllable data collected was that the incremental scoring system within the syllable screener appeared to have worked. Year One School A (*n = 73*) and Year One School B (*n = 34*) began the year with an average score of 10.66 and 9.39 (the similarity of scores is also worth noting!). Year Two School B (*n = 43*) had an average score above this of 16.84, whilst Year Three School A (*n = 92*) was still further above this with 24.96. Consequently, the different ages of participants were adequately accounted for within the assessment. Equally, this difference remained steadfast throughout the intervention with Year One's data in both School A and B staying mostly below that of Year Two. Similarly, Year Three always remained above Year Two. This supported the claim made in section C of congruence between the syllable assessments. This pre-test data did, however, raise questions twofold: first, why was there a difference in syllable scores within a year cohort, and second, why was there a difference in syllable scores within all participants? If, as I argue in the literature review, syllabification requires instruction then how does this explain the incremental increases? This is something explored later in this section (E) as well as discussed in detail in section G.

Of particular interest was the fact that all children made progress in syllable awareness, irrespective of whether they received the syllable intervention or not. During my MSc research, syllable awareness did not improve for the children who did not receive the syllable intervention, which was explained by the fact that those children were not being exposed to any form of extra phonics teaching: syllable or synthetic. The literature had also alluded to the idea that syllable awareness is a skill which needs to be taught (Henry, 1988; Tarraran, 2018; Mesmer and Lake, 2020) therefore it stood to reason that if the children were not being taught syllabic skills their awareness would not improve. The data would, however, counter this and align itself more with Choi and colleagues (2017) that onset and rime awareness does not require conscious improvement. This is because classes A1.2, A1.4, A3.4, A3.5, B1.1, B1.2, B2.1 and B2.2 all followed the synthetic phonic intervention but still increased their syllable awareness by an average score of 5.53 (*SD* = 5.27), 8.94 (*SD* = 5.57), 0.65 (*SD* = *7*.49), 2.00 (*SD* = 3.74), 6.07 (*SD* = *4.84*), 10.71 (*SD* = *5.48*), 4.33 (*SD* = *5.49*) and 5.79 (*SD* = *4.53*) respectively.

Having said this, however, the data presented from Schools A and B indicated that the classes who received the syllable intervention over the 25 weeks all made greater progress in their syllable awareness compared with the classes who received the extra synthetic phonic instruction. This progress was significant at $p < .05$ for A1.1, A1.3, A3.2, B1.3 and B2.3 with a strong effect size for almost all comparisons. Whilst A3.1 and A3.3 (in both comparisons) also made greater progress in syllable awareness than their matched classes (2.05, 2.04 0.69 more on average), the progress was not significant at $p < .05$. This significance can also be seen visually by plotting standard error which is presented in table E.3.2.10 below. In plotting the standard error for each class as an error bar there are obvious overlaps for B1.3 and B1.2 as well as A3.3 with A3.4 and A3.5. Therefore, we cannot be confident in the significance of the progress made in syllable awareness for these two classes.

Table E.3.2.10 Average Syllable Progress Error Bars



Nevertheless, with this caution in mind, the next step in answering RQ1 was to move on to examining whether any causality could be established between improving syllable awareness and reading and spelling.

E.3.3 Reading ability

Reading in all schools was measured through the SRT. The data was collected at the beginning, middle and end of the research for each year apart from Year Three who did not complete a mid-year assessment (as explained in section E). For each assessment point I have included both the average reading age of the class as well as how this equates to the actual average age of the class.

In School A, the average age of Year One on 1st September 2016 was 5.60 years old. The average reading age was 6.51 years. In February 2017 this increased to 7.75 years and in June this stood at 8.34 years. Accounting for age, Year One began the year with an average reading age of 0.91 years above their actual age. This then progressed to 1.74 years above their age and ended 1.99 years above. The overall average progress made was 1.83 reading years, 1.08 years when accounting for the months between assessments. Table E.3.3.1 presents the data for Year One School A:

Table E.3.3.1 School A, Year One Reading Progress

			Salford Reading Age							
		Age when starting 1st September 2016	Autumn Sept 16	Reading age minus actual age	Spring Feb17	Reading age minus actual age	Summer Jun- 17	Reading age minus actual age	Reading Progress in Years	Progress in Years minus 9 months
Syllables A1.1	Mean	5.55	6.72	1.17	7.75	1.78	8.51	2.22	1.80	1.05
	SD	0.32	2.26	2.29	2.19	2.20	2.14	2.12	1.05	1.05
	SE	0.08	0.55	0.55	0.53	0.53	0.52	0.51	0.25	0.25
Synthetic A1.2	Mean	5.60	6.52	0.92	7.64	1.63	8.36	2.01	1.85	1.10
	SD	0.27	2.44	2.41	1.89	1.87	2.08	2.02	1.27	1.27
	SE	0.06	0.56	0.55	0.43	0.43	0.48	0.46	0.29	0.29
	Comparison	-0.05	0.20	0.25	0.11	0.16	0.15	0.20	-0.05	-0.05
Syllables A1.3	Mean	5.62	6.37	0.75	7.70	1.66	8.25	1.87	1.88	1.13
	SD	0.28	2.17	2.18	1.92	1.88	1.88	1.82	1.23	1.23
	SE	0.06	0.50	0.50	0.44	0.43	0.43	0.42	0.28	0.28
Synthetic A1.4	Mean	5.62	6.43	0.81	7.90	1.87	8.23	1.86	1.80	1.05
	SD	0.33	2.11	2.11	2.01	2.03	1.94	1.99	0.91	0.91
	SE	0.08	0.50	0.50	0.47	0.48	0.46	0.47	0.21	0.21
	Comparison	0.01	-0.06	-0.07	-0.20	-0.21	0.02	0.01	0.08	0.08
	Year One Mean	5.60	6.51	0.91	7.75	1.74	8.34	1.99	1.83	1.08

A1.1 began the intervention with a higher reading age than A1.2. This was both in overall average age by 0.20 years (6.72 years versus 6.52 years) as well as accounting for actual age by 0.25 years (1.17 years versus 0.92 years). Conversely, A1.3 had a lower reading age than A1.4, both in overall average age by 0.06 years (6.37 years versus 6.43 years) as well as accounting for actual age by 0.07 years (0.75 years versus 0.81 years). In February, both synthetic phonic classes A1.2 and A1.4 improved their reading ages from 6.52 years to 7.64 years and 6.43 years to 7.90 years. This represented a progress of 1.13 and 1.47 years respectively. The two classes in the syllable group, A1.1 and A1.3,

improved their reading ages from 6.72 years to 7.75 years and 6.37 years to 7.70 years. This represented a progress of 1.03 years and 1.33 years.

In June 2017, the synthetic phonic groups A1.2 and A1.4 had an average reading age of 8.36 years and 8.23 years. This was an average progress of 1.85 years (*SD = 1.27*) (0.72 since February) and 1.80 years (*SD = 0.91*) (0.33 since February). The syllable groups A1.1 and A1.3 had an average reading age of 8.51 years and 8.25 years. This was an average progress of 1.80 years (*SD = 1.05*) (0.76 since February) and 1.88 years (*SD = 1.23*) (0.55 years since February).

Returning to the means within the matched classes, A1.1 had an average progress in reading age which was 0.05 years less than A1.2. The Mann-Whitney U-Test indicated (see table E.3.3.2 below) that this was not significant ($U = 154.5$, $p = .83$, $r = -.02$). Similarly, A1.3 had an average progress in reading age which was 0.08 greater than A1.4. The Mann-Whitney U-Test indicated (see table E.3.3.2 below) that this was also not significant ($U = 163.5$, $p = .83$, $r = .04$).

Table E.3.3.2 School A, Year One Reading Mann-Whitney U-Test

	A1.1	A1,2	A1.1 & A1.2 combined	A1.3	A1.4	A1.3 & A1.4 combined
Sum of ranks:	307.5	358.5	666	368.5	334.5	703
Mean of ranks:	18.09	18.87	18.5	19.39	18.58	19
Standard Deviation:			31.56			32.91
U-value:	168.5	154.5	154.5	163.5	178.5	163.5
Critical value			p < .05 is 99 ∴ 154.5 = not significant at p < .05.			p < .05 is 106 ∴ 163.5 = not significant at p < .05.
Z-Score			0.20597			0.21271
p-value <			.83			.83
r			-.02			.04
β			.05			.06

In School A, the average age of Year Three on 1st September 2016 was 7.57 years old. The average reading age was 9.75 years. In June this increased to 10.95 years. Accounting for age, Year Three began the year with an average reading age of 2.18 years

above their actual age and finished 2.63 years above. The overall average progress made was 1.20 reading years, 0.45 years when accounting for the months between assessments. Table E.3.3.3 presents the data for Year Three School A:

Table E.3.3.3 School A, Year Three Reading Progress

			Salford Reading Age Y3					
		Age when starting 1st September 2016	Sep 2016 Age	Reading age minus actual age	June 2017 Age	Reading age minus actual age	Reading Progress in Years	Progress in Years minus 9 months
A3.2	Mean	7.63	9.90	2.27	10.93	2.56	1.04	0.29
	SD	0.32	1.18	1.04	0.50	0.43	0.91	0.91
	SE	0.08	0.29	0.25	0.12	0.10	0.22	0.22
A3.4	Mean	7.65	10.10	2.45	10.99	2.59	0.89	0.14
	SD	0.30	1.10	1.05	0.29	0.39	0.92	0.92
	SE	0.07	0.25	0.23	0.07	0.09	0.21	0.21
	Comparison	-0.03	-0.21	-0.18	-0.06	-0.03	0.15	0.15
A3.1	Mean	7.40	9.61	2.21	10.93	2.78	1.32	0.57
	SD	0.28	1.32	1.26	0.59	0.56	0.91	0.91
	SE	0.06	0.30	0.28	0.13	0.13	0.20	0.20
A3.5	Mean	7.68	9.91	2.23	11.06	2.63	1.15	0.40
	SD	0.30	1.25	1.33	0.47	0.48	1.10	1.10
	SE	0.07	0.31	0.33	0.12	0.12	0.28	0.28
	Comparison	-0.28	-0.30	-0.02	-0.13	0.15	0.17	0.17
A3.3	Mean	7.51	9.22	1.71	10.83	2.57	1.61	0.86
	SD	0.27	1.22	1.28	0.69	0.65	0.91	0.91
	SE	0.07	0.30	0.32	0.17	0.16	0.23	0.23
A3.4	Mean	7.65	10.10	2.45	10.99	2.59	0.89	0.14
	SD	0.30	1.10	1.05	0.29	0.39	0.92	0.92
	SE	0.07	0.25	0.23	0.07	0.09	0.21	0.21
	Comparison	-0.15	-0.89	-0.74	-0.16	-0.01	0.72	0.72
A3.3	Mean	7.51	9.22	1.71	10.83	2.57	1.61	0.86
	SD	0.27	1.22	1.28	0.69	0.65	0.91	0.91
	SE	0.07	0.30	0.32	0.17	0.16	0.23	0.23
A3.5	Mean	7.68	9.91	2.23	11.06	2.63	1.15	0.40
	SD	0.30	1.25	1.33	0.47	0.48	1.10	1.10
	SE	0.07	0.31	0.33	0.12	0.12	0.28	0.28
	Comparison	-0.17	-0.69	-0.52	-0.23	-0.06	0.46	0.46
	Year Three Mean	7.57	9.75	2.18	10.95	2.63	1.20	0.45

A3.2 began the intervention with a lower reading age than A3.4. This was both in overall average age by 0.21 years (9.90 years versus 10.10 years) as well as accounting for actual age by 0.18 years (2.27 years versus 2.45 years). Similarly, A3.1 had a lower reading age than A3.5, both in overall average age by 0.30 years (9.61 years versus 9.91 years) as well as accounting for actual age by 0.02 years (2.21 years versus *2.23* years).

A3.3 was lower than both A3.4 by 0.89 years and A3.5 by 0.69 years with an average reading age of 9.22 years and 1.71 years accounting for age.

In June 2017, the two synthetic phonic groups A3.4 and A3.5 had an average reading age of 10.99 years and 11.06 years. This represented an average progress of 0.89 years (*SD = 0.92*) and 1.15 years (*SD = 1.10*). The syllable groups (A3.1, A3.2 and A3.3) had an average reading age of 10.93 years, 10.93 years and 10.83 years respectively. This represented an average progress of 1.32 years (*SD = 0.91*), 1.04 years (*SD = 0.91*) and 1.61 years (*SD = 0.91*).

Returning to the means within the matched classes, A3.2 made an average progress in reading age 0.15 years greater than A3.4. The Mann-Whitney U-Test indicated (see table E.3.3.4 below) that this was not significant (*U* = 153.5, *p* = .62, *r* = .08). Similarly, A3.1 had an average progress in reading age which was 0.17 years greater than A3.5 which (see table E.3.3.4 below) was also not significant (*U* = 133, *p* = .41, *r* = .09). A3.3 made comparatively more progress than A3.4 by 0.72 years and more than A3.5 by 0.46 years. The Mann-Whitney U-Test indicated that this was significant (*U* = 79.5, *p* = .01, *r* = .37) when compared with A3.4 (see table E.3.3.5 below) but not significant when compared with A3.5 (*U* = 84, *p* = .11, *r* = .22).

Table E.3.3.4 School A, Year Three Reading Mann-Whitney U-Test No. 1

	A3.2	A3.4	A3.2 & A3.4 combined	A3.1	A3.5	A3.1 & A3.5 combined
Sum of ranks:	339.5	363.5	703	397	269	666
Mean of ranks:	19.97	18.18	19	19.85	16.81	18.5
Standard Deviation:			32.81			31.41
U-value:	153.5	186.5	153.5	133	187	133
Critical value			p < .05 is 105 ∴ 153.5 = not significant at p < .05.			p < .05 is 98 ∴ 133 = not significant at p < .05.
Z-Score	-0.48762		-0.48762			0.84365
p-value <			.62			.41
r			.08			.09
β			.08			.11

Table E.3.3.5 School A, Year Three Reading Mann-Whitney U-Test No. 2

	A3.3	A3.4	A3.3 & A3.4 combined	A3.3	A3.5	A3.3 & A3.5 combined
Sum of ranks:	376.5	289.5	666	308	220	528
Mean of ranks:	23.53	14.48	18.5	19.25	13.75	16.5
Standard Deviation:			31.41			26.53
U-value:	79.5	240.5	79.5	84	172	84
Critical value			p < .05 is 98 ∴ 79.5 = significant at p < .05.			p < .05 is 75 ∴ 84 = not significant at p < .05.
Z-Score			-2.54686			1.63947
p-value <			.01			.11
r			.37			.22
β			.58			.26

In School B, the average age of Year One on 1st September 2016 was 5.50 years old. The average reading age was 5.44 years. In February 2017 this increased to 5.58 years and in June this stood at 6.36 years. Accounting for age, Year One began the year with an average reading age of 0.06 years below their actual age. This then progressed to 0.33 years below and ended 0.11 years above their actual age. The overall average progress made was 0.92 reading years, 0.17 years when accounting for the months between assessments. Table E.3.3.6 presents the data for Year One School B:

Table E.3.3.6 School B, Year One Reading Progress

				Salford Reading Age							
			Age when starting 1st September 2016	Autumn Sept 16	Reading age minus actual age	Spring Feb17	Reading age minus actual age	Summer Jun- 17	Reading age minus actual age	Reading Progress in Years	Progress in Years minus 9 months
B1.3	Syllables	Mean	5.46	4.56	-0.90	4.61	-1.26	5.32	-0.89	0.76	0.01
		SD	0.38	0.36	0.64	0.16	0.30	0.49	0.60	0.46	0.46
		SE	0.15	0.15	0.26	0.07	0.12	0.20	0.24	0.19	0.19
B1.1	Synthetic	Mean	5.58	5.77	0.19	5.96	-0.03	6.85	0.52	1.08	0.33
		SD	0.27	0.89	0.93	1.14	1.13	1.01	1.03	0.58	0.58
		SE	0.07	0.24	0.25	0.30	0.30	0.27	0.28	0.16	0.16
		Comparison	-0.12	-1.21	-1.09	-1.35	-1.23	-1.53	-1.41	-0.31	-0.31
B1.3	Syllables	Mean	5.46	4.56	-0.90	4.61	-1.26	5.32	-0.89	0.76	0.01
		SD	0.38	0.36	0.64	0.16	0.30	0.49	0.60	0.46	0.46
		SE	0.15	0.15	0.26	0.07	0.12	0.20	0.24	0.19	0.19
B1.2	Synthetic	Mean	5.47	6.00	0.53	6.18	0.29	6.92	0.70	0.92	0.17
		SD	0.24	1.55	1.68	2.02	2.12	1.66	1.77	0.75	0.75
		SE	0.06	0.42	0.45	0.54	0.57	0.44	0.47	0.20	0.20
		Comparison	-0.01	-1.44	-1.43	-1.57	-1.56	-1.60	-1.59	-0.16	-0.16
		Year One Mean	5.50	5.44	-0.06	5.58	-0.33	6.36	0.11	0.92	0.17

B1.2 began the intervention with the highest reading age of 6.00 years, 0.53 years above their age. B1.1 was second highest with an average reading age of 5.77 years, 0.19 years above their age. B1.3 was significantly lower with an average reading age of 4.56 years, 0.90 years below their actual age. This order remained the same in February, with B1.2 scoring an average reading age of 6.18 years, 0.29 years above their age. B1.1 increased their average reading age to 5.96 years but accounting for age this put them 0.03 years below their actual age. B1.3 fell further behind with a reading age of 4.61 years, 1.26 years below their actual age. In June, B1.2 had an average reading age of 6.92 years. This was 0.70 years above their age and equated to 0.92 years progress (*SD = 0.75*), 0.17 when accounting for the time passed between assessments. B1.1 ended the year with a reading age of 6.85 years, 0.52 years above their reading age. This represented a progress of 1.08 years (*SD = 0.58*), 0.33 once accounting for the time passed. B1.3 increased their reading age to 5.32 years. Whilst this was still below their actual age by 0.89 years, this represented 0.76 years of progress (*SD = 0.46*), 0.01 accounting for time passed.

Returning to the means between the classes, B1.3 had an average progress in reading age which was 0.31 years less than B1.1. The Mann-Whitney U-Test indicated (see table E.3.3.7 below) that this progress was not significant (U = 27, p = .23, r = .29). Similarly for B1.3 which had an average progress in reading age which was 0.16 years less than B1.2 the Mann-Whitney U-Test indicated the progress made was not significant (U = 37.5, p = .74, r = .13).

Table E.3.3.7 School B, Year One Reading Mann-Whitney U-Test

	B1.3	B1.1	B1.3 & B1.1 combined	B1.3	B1.2	B1.3 & B1.2 combined
Sum of ranks:	48	162	210	58.5	151.5	210
Mean of ranks:	8	11.57	10.5	9.75	10.82	10.5
Standard Deviation:			12.12			12.12
U-value:	57	27	27	46.5	37.5	37.5
Critical value			p < .05 is 17 ∴ 27 = not significant at p < .05.			p < .05 is 17 ∴ 37.5 = not significant at p < .05.
Z-Score			1.19594			0.32991
p-value <			.23			.74
r			.29			.13
β			.22			.08

In School B, the average age of Year Two on 1st September 2016 was 6.55 years old. The average reading age was 7.81 years. In February 2017 this increased to 8.84 years and in June this stood at 9.73 years. Accounting for age, Year Two began the year with an average reading age of 1.26 years above their actual age. This then progressed to 1.87 years above and ended 2.43 years above their actual age. The overall average progress made was 1.92 reading years, 1.17 years when accounting for the months between assessments. Table E.3.3.8 presents the data for Year Two School B:

Table E.3.3.8 School B, Year Two Reading Progress

				Salford Reading Age							
			Age when starting 1st September 2016	Autumn Sept 16	Reading age minus actual age	Spring Feb17	Reading age minus actual age	Summer Jun- 17	Reading age minus actual age	Reading Progress in Years	Progress in Years minus 9 months
B2.3	Syllables	Mean	6.57	6.12	-0.45	7.84	0.86	9.04	1.72	2.92	2.17
		SD	0.32	0.92	1.03	1.40	1.51	1.18	1.35	0.76	0.76
		SE	0.08	0.25	0.27	0.37	0.40	0.31	0.36	0.20	0.20
B2.1	Synthetic	Mean	6.52	8.28	1.76	8.66	1.72	9.78	2.52	1.51	0.76
		SD	0.31	2.05	2.05	2.12	2.15	1.40	1.37	1.03	1.03
		SE	0.08	0.53	0.53	0.55	0.56	0.36	0.35	0.27	0.27
		Comparison	0.05	-2.16	-2.21	-0.82	-0.87	-0.75	-0.79	1.41	1.41
B2.3	Syllables	Mean	6.57	6.12	-0.45	7.84	0.86	9.04	1.72	2.92	2.17
		SD	0.32	0.92	1.03	1.40	1.51	1.18	1.35	0.76	0.76
		SE	0.08	0.25	0.27	0.37	0.40	0.31	0.36	0.20	0.20
B2.2	Synthetic	Mean	6.57	9.05	2.47	10.03	3.04	10.38	3.06	1.34	0.59
		SD	0.34	1.48	1.55	1.41	1.44	1.16	1.22	0.80	0.80
		SE	0.09	0.39	0.41	0.38	0.38	0.31	0.33	0.21	0.21
		Comparison	-0.01	-2.93	-2.92	-2.19	-2.18	-1.34	-1.34	1.58	1.58
		Year Two Mean	6.55	7.81	1.26	8.84	1.87	9.73	2.43	1.92	1.17

B2.2 began the intervention with the highest reading age of 9.05 years, 2.47 years above their age. B2.1 was second highest with an average reading age of 8.28 years, 1.76 years above their age. B2.3 was lower with an average reading age of 6.12 years, 0.45 years below their actual age. This order remained the same in February, with B2.2 scoring an average reading age of 10.03 years, 3.04 years above their age. B2.1 increased their average reading age to 8.66 years. Accounting for age this put them 1.72 years above their actual age. B2.3 increased their reading age from 6.12 to 7.84 years, 0.86 years above their actual age. In June, B2.2 had an average reading age of 10.38 years. This was 3.06 years above their age and represented a progress of 1.34 years (*SD = 0.80*), 0.59 when accounting for the time passed between assessments. B2.1 ended the year with a reading age of 9.78 years, 2.52 years above their reading age. This represented a progress of 1.51 years (*SD = 1.03*), 0.76 once accounting for the time passed. B2.3 increased their reading age to 9.04 years. This was 1.72 years above their actual age, representing 2.92 years progress (*SD = 0.76*), 2.17 accounting for time passed.

Returning to the means between the classes, B2.3 had an average progress in reading age which was 1.41 years more than B2.1. The Mann-Whitney U-Test indicated (see table E.3.3.9 below) that the progress made by B2.3 was significant (U = 31.5, p = .001, r = .61). Similarly, B2.3 had an average progress in reading age which was 1.58 years more than B2.2. The Mann-Whitney U-Test indicated (see table E.3.3.9 below) that this was also significant (U = 11, p = .0001, r = .72).

Table E.3.3.9 School B, Year Two Reading Mann-Whitney U-Test

	B2.3	B2.1	B2.3 & B2.1 combined	B2.3	B2.2	B2.3 & B2.2 combined
Sum of ranks:	283.5	151.5	435	290	116	406
Mean of ranks:	20.25	10.1	15	20.71	8.29	14.5
Standard Deviation:			22.91			21.76
U-value:	31.5	178.5	31.5	11	185	11
Critical value			p < .05 is 59 ∴ 31.5 = significant at p < .05.			p < .05 is 55 ∴ 11 = significant at p < .05.
Z-Score			-3.18598			3.97447
p-value <			.00142			.00008
r			.61			.72
β			.74			.86

Analysis and Discussion:

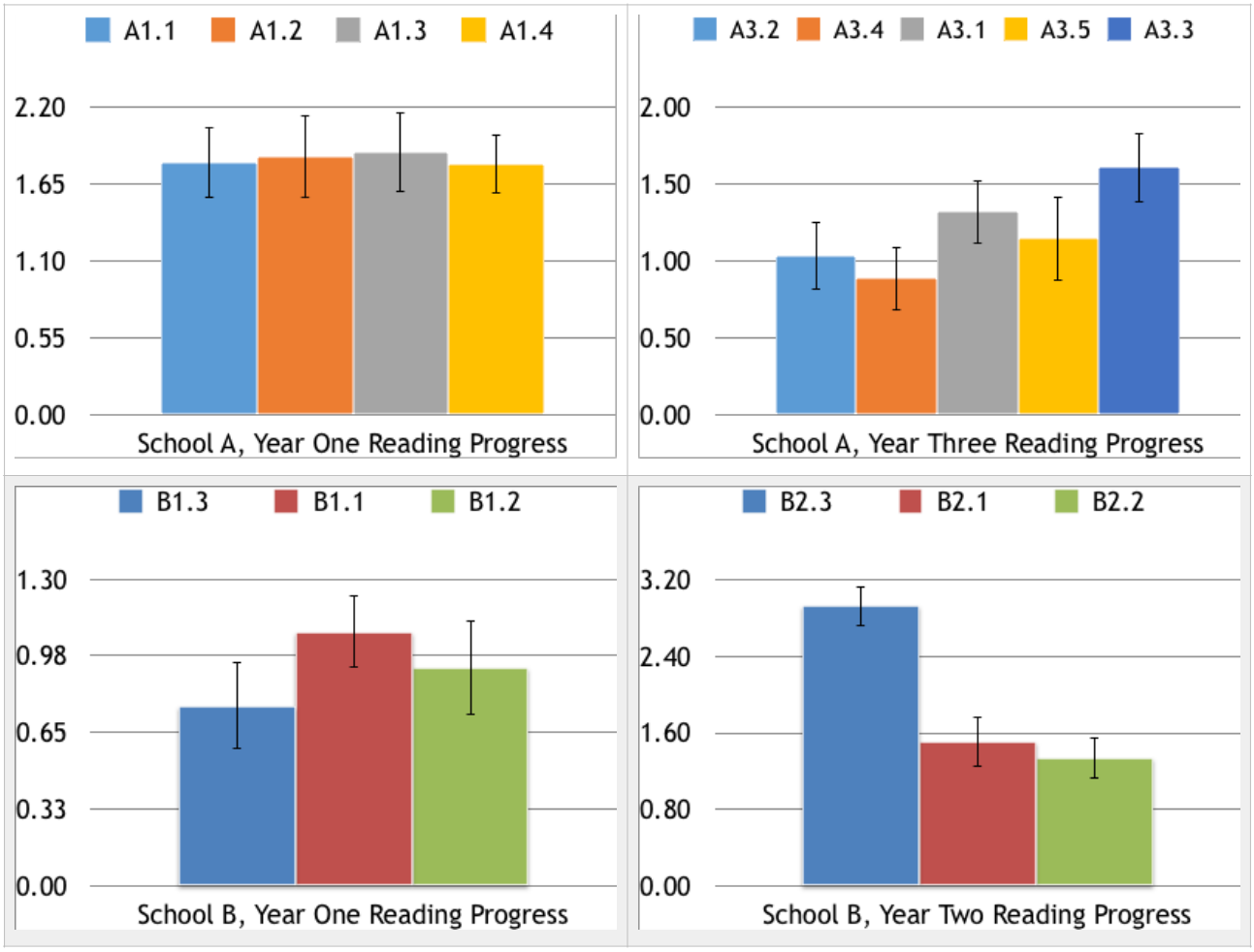
I would like to begin this analysis and discussion with School B. This is because, unlike School A where classes were matched, School B had streamed its phonic classes by ability. This can be clearly seen in both Years One and Two in School B where the second class in each year (B1.2 and B2.2) have the highest average reading age above their actual age of 0.53 years and 2.47 years. B1.1 and B2.1 are the middle sets with an average reading age above the actual age of 0.19 years and 1.76 years. B1.3 and B2.3 were purposefully chosen to receive the intervention because they were identified as being the lowest sets for phonics. Consequently, their average reading ages of 0.90 years and 0.45 years below their actual age were of little surprise but important to note.

Due to the classes being streamed, a fair comparison between the School B classes cannot be made. Nevertheless, there is value in contrasting the different responses from the two syllable classes as there was a discernible difference in the data between Year One and Year Two. Whilst both classes who received the syllable intervention made progress with their reading, B1.3 remained firmly behind their comparison groups (B1.1 and B1.2); not only in their post-test reading age (-1.53 years and -1.60 years) but also in overall average progress (-0.31 years and -0.16 years). Conversely, B2.3 began the intervention similarly behind their comparison groups (B2.1 and B2.2) in their initial reading age by 2.16 years and 2.93 years but narrowed the gap by June to just 0.75 years and 1.34 years, representing an average progress which was 1.41 years and 1.58 years greater than the comparison groups. A similar pattern was apparent in School A where the matched data between A1.1 and A1.2, as well as A1.3 and A1.4 indicated little difference in average reading progress (-0.05 years and 0.08 years respectively). Conversely in Year Three, the data indicated that in each comparison (A3.2 versus A3.4, A3.1 versus A3.5, A3.3 versus A3.4 and A3.3 versus A3.5) the class which received the syllable intervention made, on average, more reading progress by 0.15, 0.17, 0.72 and 0.46 years respectively.

This data combined began to form a line of interest amongst colleagues and myself which centred on the idea that the impact of syllable awareness on reading might be dependent on the age of the participant. As discussed in section B, children in Years Two and Three who struggled with phonics may have had a syllabic block which affects subsequent phonemic development due to phonological hierarchy (Brady and Shankweiler, 2013; Treiman, 2013; Zieger and Goswami, 2005; Goswami, 2006). Consequently, the intervention may have offered some children an alternative approach to blending and segmenting words. The reason why the intervention may have had less impact for participants in Year One might be because children did not encounter enough polysyllabic words for the intervention to have an effect. This will be expanded on in subsequent RQs.

With the exception of A1.1 and B1.3, children who received the syllable intervention (A1.3, B2.3, A3.2, A3.1 and A3.3) made greater average progress with their reading than those who followed the synthetic phonic treatment by 0.08 years, 1.41 years, 1.58 years, 0.15 years, 0.17 years, 0.72 and 0.46 years respectively. Caution must, however, be applied when discussing causality as the Mann-Whitney U-Test indicated that this progress was only significant at $p < .05$ for A3.3 (small effect) and B2.3 (moderate effect). This is further corroborated when looking at the standard error as presented in Table E.3.3.10 below:

Table E.3.3.10 Average Reading Progress Error Bars



When looking at these error bars it is clear that there is significant overlap in error bars for every comparison apart from B2.3 and A3.3 versus A3.4. Consequently, whilst the classes receiving the syllable intervention mostly made greater progress in reading than the classes receiving the synthetic phonic intervention, this progress is only statistically significant for classes B2.3 and A3.3. Therefore it cannot necessarily be claimed that there is a clear relationship between syllable awareness and reading development. The next section will explore spelling progress.

E.3.4 Spelling ability

Spelling in all schools was measured through the SWST. Unlike syllable awareness and reading progress, the SWST was only administered twice; pre- and post-intervention. For each assessment point I have included both the average spelling age of the class as well as how this relates to the actual average age of the class.

In School A, the average age of Year One on 1st September 2016 was 5.60 years old. The average spelling age was 5.80 years which increased to 7.27 years in June 2017. Accounting for age, Year One began the year with an average spelling age of 0.20 years above their actual age and finished with a spelling age 0.92 years above their age. The overall average spelling progress made was 1.46 years, 0.71 years when accounting for the months between assessments. Table E.3.4.1 presents the data for Year One School A:

Table E.3.4.1 School A, Year One Spelling Progress

			SWST Spelling Age					
		Age when starting 1st September 2016	Oct 16 Age	Spelling age minus actual age	Jun 17 Age	Spelling age minus actual age	Spelling progress in years	Progress in Years minus 9 months
Syllables A1.1	Mean	5.55	5.77	0.23	7.42	1.12	1.65	0.90
	SD	0.32	1.02	1.13	1.04	1.08	0.73	0.73
	SE	0.08	0.25	0.27	0.25	0.26	0.18	0.18
Synthetic A1.2	Mean	5.60	5.98	0.38	7.44	1.09	1.47	0.72
	SD	0.27	1.36	1.33	1.24	1.21	0.89	0.89
	SE	0.06	0.31	0.31	0.28	0.28	0.20	0.20
	Comparison	-0.05	-0.20	-0.15	-0.02	0.03	0.18	0.18
Syllables A1.3	Mean	5.62	5.61	-0.02	7.22	0.85	1.61	0.86
	SD	0.28	1.03	1.06	0.96	0.96	0.91	0.91
	SE	0.06	0.24	0.24	0.22	0.22	0.21	0.21
Synthetic A1.4	Mean	5.62	5.84	0.23	6.98	0.61	1.13	0.38
	SD	0.33	1.13	1.14	1.19	1.20	0.66	0.66
	SE	0.08	0.27	0.27	0.28	0.28	0.15	0.15
	Comparison	0.01	-0.24	-0.25	0.24	0.24	0.48	0.48
	Year One Mean	5.60	5.80	0.20	7.27	0.92	1.46	0.71

A1.2 began the intervention with a higher spelling age than A1.1. This was both in overall average age by 0.20 years (5.98 years versus 5.77 years) as well as accounting for actual age by 0.15 years (0.38 years versus 0.23 years). Similarly, A1.4 had a higher spelling age than A1.3, both in overall average age by 0.24 years (5.84 years versus 5.61 years) as well as accounting for actual age by 0.25 years (0.23 years versus -0.02 years).

In June 2017, A1.2 still had a higher average spelling age than A1.1 by 0.02 years (7.44 years versus 7.42 years) however accounting for age this reduced, resulting in A1.1 having a higher above age spelling score by 0.03 years (1.12 years versus 1.09 years). This shift was reflected in the average spelling progress with A1.1 making 0.18 years more progress than A1.2 (1.65 years, *SD = 0.73* versus 1.47 years, *SD = 0.89*). The Mann-Whitney U-Test indicated that the comparison between A1.1 and A1.2 (see table E.3.4.2 below) was not significant (U = 143.5, p = .58, r = .22).

In June 2017, A1.3 had a higher average spelling age than A1.4 by 0.24 years (7.22 years versus 6.98 years), and when accounting for age, A1.3 remained higher than A1.4 with an above age spelling score of 0.24 years (0.84 years versus 0.61 years). This was reflected in the average spelling progress made with A1.3 making 0.48 years more progress than A1.4 (1.61 years, *SD = 0.91* versus 1.13 years, *SD = 0.66*). The Mann-Whitney U-Test indicated that the comparison between A1.3 and A1.4 (see table E.3.4.2 below) was also not significant (U = 163.5, p = .12, r = .29).

Table E.3.4.2 School A, Year One Spelling Mann-Whitney U-Test

	A1.1	A1,2	A1.1 & A1.2 combined	A1.3	A1.4	A1.3 & A1.4 combined
Sum of ranks:	332.5	333.5	666	412.5	290.5	703
Mean of ranks:	19.56	17.55	18.5	21.71	16.14	19
Standard Deviation:			31.56			32.91
U-value:	143.5	179.5	143.5	119.5	222.5	163.5
Critical value			p < .05 is 99 ∴ 143.5 = not significant at p < .05.			p < .05 is 119.5 ∴ 163.5 = not significant at p < .05.
Z-Score			-0.55453			1.54973
p-value <			.58			.12
r			.22			.29
β			.1			.39

In School A, the average age of Year Three on 1st September 2016 was 7.57 years old. The average spelling age was 8.24 years which increased to 8.76 years in June 2017. Accounting for age, Year Three began the year with an average spelling age of 0.67 years above their actual age and finished with a spelling age 0.46 years above their age. The overall average spelling progress made was 0.53 years, -0.22 years when accounting for the months between assessments. Table E.3.4.3 presents the data for Year Three School A:

Table E.3.4.3 School A, Year Three Spelling Progress

			SWST					
		Age when starting 1st September 2016	Spelling Age Sept 2016	Spelling age minus actual age	Spelling Age June 2017	Spelling age minus actual age	Spelling progress in years	Progress in Years minus 9 months
A3.2	Mean	7.63	8.53	0.91	9.03	0.65	0.51	-0.24
	SD	0.32	0.86	0.75	0.59	0.49	0.51	0.51
	SE	0.08	0.21	0.18	0.14	0.12	0.12	0.12
A3.4	Mean	7.65	8.53	0.87	8.83	0.43	0.31	-0.44
	SD	0.30	0.80	0.74	0.60	0.56	0.45	0.45
	SE	0.07	0.18	0.17	0.14	0.12	0.10	0.10
	Comparison	-0.03	0.01	0.04	0.20	0.22	0.20	0.20
A3.1	Mean	7.40	8.09	0.73	8.82	0.71	0.73	-0.02
	SD	0.28	1.01	1.04	0.57	0.66	0.65	0.65
	SE	0.06	0.23	0.23	0.13	0.15	0.14	0.14
A3.5	Mean	7.68	8.17	0.52	8.70	0.31	0.54	-0.21
	SD	0.30	0.91	0.92	0.70	0.71	0.51	0.51
	SE	0.07	0.23	0.23	0.17	0.18	0.13	0.13
	Comparison	-0.28	-0.08	0.21	0.12	0.40	0.19	0.19
A3.3	Mean	7.51	7.89	0.39	8.44	0.18	0.55	-0.20
	SD	0.27	1.06	1.14	0.98	1.04	0.47	0.47
	SE	0.07	0.26	0.28	0.25	0.26	0.12	0.12
A3.4	Mean	7.65	8.53	0.87	8.83	0.43	0.31	-0.44
	SD	0.30	0.80	0.74	0.60	0.56	0.45	0.45
	SE	0.07	0.18	0.17	0.14	0.12	0.10	0.10
	Comparison	-0.15	-0.63	-0.49	-0.39	-0.24	0.24	0.24
A3.3	Mean	7.51	7.89	0.39	8.44	0.18	0.55	-0.20
	SD	0.27	1.06	1.14	0.98	1.04	0.47	0.47
	SE	0.07	0.26	0.28	0.25	0.26	0.12	0.12
A3.5	Mean	7.68	8.17	0.52	8.70	0.31	0.54	-0.21
	SD	0.30	0.91	0.92	0.70	0.71	0.51	0.51
	SE	0.07	0.23	0.23	0.17	0.18	0.13	0.13
	Comparison	-0.17	-0.28	-0.13	-0.26	-0.13	0.01	0.01
	Year Three Mean	7.57	8.24	0.68	8.76	0.46	0.53	-0.22

A3.2 began the intervention with an almost identical average spelling compared to A3.4. This was both in overall average age by 0.01 years (8.53 years versus 8.53 years) as well as accounting for actual age 0.04 years (0.91 years versus 0.87 years). A3.1 had a lower average spelling age than A3.5 by 0.08 years (8.09 years versus 8.17 years) but when accounting for age, this was reversed with A3.1 having an average spelling age 0.21 years above A3.5 (0.73 years versus 0.52 years). Similarly, A3.3 had a spelling age below both A3.4 by 0.63 years (7.89 years versus 8.53 years) and A3.5 by 0.28 years (7.89 years

versus 8.17 years). This gap slightly reduced when taking age into account although A3.3 was still behind both A3.4 by 0.49 years (0.39 years versus 0.87 years) and A3.5 by 0.13 years (0.39 years versus 0.52 years).

In June 2017, A3.2 had a higher average spelling age than A3.4 by 0.20 years (9.03 years versus 8.83 years) and accounting for age this increased to an average spelling age above actual age of 0.22 years (0.65 years versus 0.43 years). This shift was reflected in the average spelling progress with A3.2 making 0.20 years more progress than A3.4 (0.51 years, *SD = 0.51* versus 0.31 years, *SD = 0.45*). The Mann-Whitney U-Test indicated that this progress was not significant (*U* = 120, *p* = .21, *r* = .21) (see table E.3.4.4 below).

Conversely, in June 2017, A3.1 had a higher average spelling age than A3.5 by 0.12 years (8.82 years versus 8.70 years). When accounting for age A3.1 had an above age spelling score higher than A3.5 by 0.40 years (0.71 years versus 0.31 years). This was reflected in the average spelling progress with A3.1 making 0.19 years more progress than A3.5 (0.73 years, *SD = 0.65* versus 0.54 years, *SD = 0.51*). The Mann-Whitney U-Test indicated that the comparison between A3.1 and A3.5 was also not significant (*U* = 103, *p* = .41, *r* = .16) (see table E.3.4.4 below).

Finally, in June 2017, A3.3 had a lower average spelling age than both A3.4 by 0.39 years (8.44 years versus 8.83 years) and A3.5 by 0.26 years (8.44 years versus 8.70 years). Accounting for age, this represented an average spelling age for A3.3 which was 0.24 years below A3.4 (0.18 years versus 0.43 years) and 0.13 years below A3.5 (0.18 years versus 0.22 years). A3.3 did, however, make the most average progress with 0.24 years more than A3.4 (0.55 years, *SD = 0.47* versus 0.31 years, *SD = 0.45*) and 0.01 years more than A3.5 (0.55 years, *SD = 0.47* versus 0.54 years, *SD = 0.51*). The Mann-Whitney U-Test indicated that the comparison between A3.3 and A3.4 as well as A3.3 and A3.5 was not significant (*U* = 107, *p* = .09, *r* = .25 and *U* = 110.5, *p* = .97, *r* = .01) (see table E.3.4.5 below).

Table E.3.4.4 School A, Year Three Spelling Mann-Whitney U-Test No. 1

	A3.2	A3.4	A3.2 & A3.4 combined	A3.1	A3.5	A3.1 & A3.5 combined
Sum of ranks:	336	330	703	320	208	528
Mean of ranks:	21	16.5	19	17.78	14.86	16.5
Standard Deviation:			32.81			26.32
U-value:	200	200	120	103	149	103
Critical value			p < .05 is 98 ∴ 120 = not significant at p < .05.			p < .05 is 74 ∴ 103 = not significant at p < .05.
Z-Score			-1.25751			0.8547
p-value <			.21			.41
r			.21			.16
β			.23			.22

Table E.3.4.5 School A, Year Three Spelling Mann-Whitney U-Test No. 2

	A3.3	A3.4	A3.3 & A3.4 combined	A3.3	A3.5	A3.3 & A3.5 combined
Sum of ranks:	349	317	666	249.5	215.5	465
Mean of ranks:	21.81	15.85	18.5	15.59	15.39	15.5
Standard Deviation:			31.41			24.06
U-value:	107	213	107	110.5	113.5	110.5
Critical value			p < .05 is 98 ∴ 107 = not significant at p < .05.			p < .05 is 64 ∴ 110.5 = not significant at p < .05.
Z-Score			-1.67138			0.04157
p-value <			.09			.97
r			.25			.01
β			.32			.05

In School B, the staff used the SWST but wanted to keep the scores in raw format. The average spelling score for Year One was 98.63 in September which increased to 103.87 in June. The overall average progress made was 5.25. Table E.3.4.6 presents the data for Year One School B:

Table E.3.4.6 School B, Year One Spelling Progress

			Age when starting 1st September 2016	SWST Spelling Age Oct 16 Raw	SWST Spelling Age Jun 17 Raw	SWST Progress
B1.3	Syllables	Mean	5.46	91.17	99.33	8.17
		SD	0.38	3.66	6.22	7.19
		SE	0.15	1.49	2.54	2.94
B1.1	Synthetic	Mean	5.58	100.71	105.29	4.57
		SD	0.27	4.48	9.14	6.96
		SE	0.07	1.20	2.44	1.86
		Comparison	-0.12	-9.55	-5.95	3.60
B1.3	Syllables	Mean	5.46	91.17	99.33	8.17
		SD	0.38	3.66	6.22	7.19
		SE	0.15	1.49	2.54	2.94
B1.2	Synthetic	Mean	5.47	104.00	107.00	3.00
		SD	0.24	10.32	13.71	7.31
		SE	0.06	2.76	3.66	1.95
		Comparison	-0.01	-12.83	-7.67	5.17
		Year One Mean	5.50	98.63	103.87	5.25

Similar to the scores for the SRT, B1.2 had the highest average score in September, followed by B1.1 and then B1.3 with 104.00, 100.71 and 91.17. This order remained the same in June with B1.2 making an average progress of 3.00 (*SD = 7.31*) to end with a post-test score of 107.00. B1.1 made an average progress of 4.57 (*SD = 6.96*) to end with a post-test score of 105.29. B1.3 made the most progress with 8.17 (*SD = 7.19*) but still ending with the lowest post-test score of 99.33.

When compared with the other classes, B1.3 made on average 3.60 more progress than B1.1 and 5.17 more progress than B1.2. The Mann-Whitney U-Test indicated (see table E. 3.4.7 below) that the comparison between B1.3 and B1.1 was not significant ($U = 31$, $p = .38$, $r = .25$). Similarly the Mann-Whitney U-Test indicated that the comparison between B1.3 and B1.2 was also not significant ($U = 23.5$, $p = .14$, $r = .36$).

Table E.3.4.7 School B, Year One Spelling Mann-Whitney U-Test

	B1.3	B1.1	B1.3 & B1.1 combined	B1.3	B1.2	B1.3 & B1.2 combined
Sum of ranks:	74	136	210	81.5	128.5	210
Mean of ranks:	12.33	9.71	10.5	13.58	9.18	10.5
Standard Deviation:			12.12			12.12
U-value:	31	53	31	23.5	60.5	23.5
Critical value			p < .05 is 17 ∴ 31 = not significant at p < .05.			p < .05 is 17 ∴ 23.5 = not significant at p < .05.
Z-Score			-0.86603			-1.48461
p-value <			.38			.14
r			.25			.36
β			.19			.31

In School B, Year Two the average spelling score in September was 96.75 which increased to 106.65 in June. The overall average progress made was 9.90. Table E.3.4.8 presents the data for Year Two School B:

Table E.3.4.8 School B, Year Two Spelling Progress

			Age when starting 1st September 2016	SWST Spelling Age		
				Oct 16 Raw	Jun 17 Raw	SWST Progress
B2.3	Syllables	Mean	6.57	92.86	102.57	9.71
		SD	0.32	5.16	7.51	8.18
		SE	0.08	1.38	2.01	2.18
B2.1	Synthetic	Mean	6.52	104.53	114.80	10.27
		SD	0.31	8.76	9.30	7.43
		SE	0.08	2.26	2.40	1.92
		Comparison	0.05	-11.68	-12.23	-0.55
B2.3	Syllables	Mean	6.57	92.86	102.57	9.71
		SD	0.32	5.16	7.51	8.18
		SE	0.08	1.38	2.01	2.18
B2.2	Synthetic	Mean	6.57	106.14	112.57	6.43
		SD	0.34	7.00	8.50	5.71
		SE	0.09	1.87	2.27	1.53
		Comparison	-0.01	-13.29	-10.00	3.29
		Year Two Mean	6.55	96.75	106.65	9.90

Similar to the scores for the SRT, B2.2 had the highest average score in September, followed by B2.1 and then B2.3 with 106.14, 104.53 and 92.86. This order remained the same in June with B2.2 making an average progress of 6.43 (*SD = 5.71*) to end with a post-test score of 112.57. B2.1 made an average progress of 10.27 (*SD = 7.43*) to end with a post-test score of 114.80. B2.3 had an average progress of 9.71 (*SD = 8.18*) ending with the lowest post test score of 102.57.

When compared with the other classes, B2.3 made on average 0.55 less progress than B2.1 but 3.29 more progress than B2.2. The Mann-Whitney U-Test indicated that the comparison between B2.3 and B2.1 was not significant ($U = 91$, $p = .56$, $r = .03$) (see table E.3.4.9 below). Similarly the Mann-Whitney U-Test indicated that the comparison between B2.3 and B2.2 was also not significant ($U = 75$, $p = .31$, $r = .22$).

Table E.3.4.9 School B, Year Two Spelling Mann-Whitney U-Test

	B2.3	B2.1	B2.3 & B2.1 combined	B2.3	B2.2	B2.3 & B2.2 combined
Sum of ranks:	196	239	435	226	180	406
Mean of ranks:	14	15.93	15	16.14	12.86	14.5
Standard Deviation:			22.91			21.76
U-value:	119	91	91	75	121	75
Critical value			$p < .05$ is 59 ∴ 91 = not significant at $p < .05$.			$p < .05$ is 55 ∴ 75 = not significant at $p < .05$.
Z-Score			0.58919			1.03382
p-value <			.56			.31
r			.03			.22
β			.05			.17

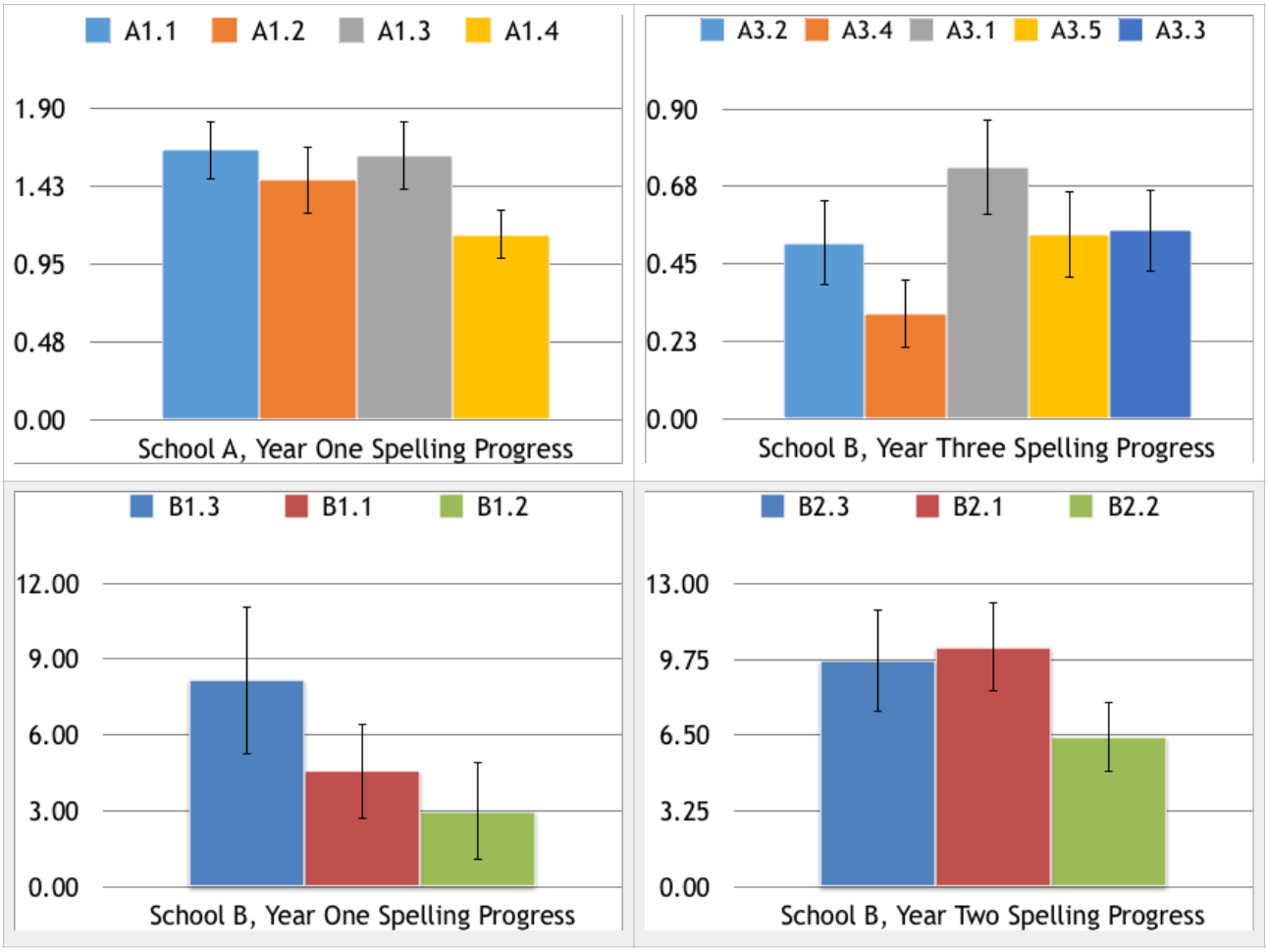
Analysis and Discussion:

In School A all the classes receiving the syllable intervention made greater mean progress in their spelling age than the synthetic phonic classes they were compared with. A1.1, A1.3, A3.2, A3.1, A3.3 all made a mean spelling progress which was above their matched classes by 0.18 years, 0.48 years, 0.20 years, 0.19 years, 0.24 years and 0.01 years respectively. Even in School B, where a matched comparison cannot be drawn, the mean spelling progress made by B2.3 and B1.3 receiving the syllable intervention was greater than B2.2 and B1.1/B1.2, although this may be partly because they started the year with a much lower spelling age due to being streamed. The comparison between B2.3 and B2.1 goes against this trend, with the class receiving synthetic phonics intervention making 0.56 years more progress.

Nevertheless, caution must be heeded when claiming any causality between the increase in syllable awareness and subsequent spelling progress made. Whilst the classes receiving the syllable instruction did progress more than almost all the participants receiving synthetic phonic instruction, the Mann-Whitney U-Test indicated that this progress was not significant at $p < .05$ in any of the comparisons (all with weak effect size).

To visually highlight this, table E.3.4.10 below shows the standard error for each mean spelling progress:

Table E.3.4.10 Average Spelling Progress Error Bars



It is clear from looking at table F3.4.10 that in every matched comparison there is an overlap in error bars, and as a result it is difficult to sustain any causality between the independent and dependent variable.

Having said this, there are some interesting patterns which are worth exploring. For example the difference between A1.3 and A1.4 in mean spelling progress of nearly half a year (0.48 years) was the largest difference in any comparison. This is a noteworthy achievement from A1.3, that in nine months had moved from a spelling age marginally below their actual age to a spelling age which was 0.86 years above. A1.3 had also made an average progress in syllable awareness which was 13.53 marks more than A1.4.

Whilst the Mann-Whitney indicated that the differences in the reading and spelling means were not significant, this pattern is something I will return to in RQ4.

In section B, I discussed some of the literature which suggested that children can spell words they cannot read (Goswami and Bryant, 1990). It is, however, interesting that every class has a standardised reading age which is higher than their standardised spelling age. Whilst there is a convincing argument that emergent spelling precedes emergent reading as discussed in the literature review (Mehta et al., 2018; Gentry and Gillet, 1993), the data supports my own experience of teaching that children's spelling often lags behind their reading.

E.3.5 RQ1 answer

Do children in Years 1, 2 and 3 who follow a 25 week intervention programme involving syllable segmentation skills show greater reading and spelling progress than a matched group who focus only on synthetic phonic skills?

I began answering this question in subsection E.2 which discussed the matching process in School A. Using the pre-test scores from the SRT, SWST and the syllable screener I gave each class a rank (1st, 2nd, 3rd and 4th) depending on how they performed in relation to each other. I also did this for their age, (1st being for the class who were, on average, the oldest). By adding these ranks for each assessment, both including and excluding age, I was able to establish classes who were comparatively similar. The matching process was, however, not perfect. Only A3.2 and A3.4 had a rank total which was identical of 9. Otherwise, there was always a difference between total ranks but I chose two classes which had the highest total ranks and two classes which had the lowest total ranks and matched them accordingly. Finally, for each matched comparison I randomly assigned one class to receive the syllable intervention and one class to receive the synthetic phonic material. This matching did not take place in School B.

After the 25 week intervention, the first step was analysing whether syllable awareness could be improved. In my analysis I noted that it was of interest that seemingly all children

made progress in syllable awareness, irrespective of whether they received the syllable intervention or not. Whilst my initial MSc research, as well as literature reviewed, had indicated syllable awareness was a skill which needed to be taught (Henry, 1988; Tarraran, 2018; Mesmer and Lake, 2020), the data I collected suggested that syllable awareness can improve naturally. Nevertheless, the data from mid- and post-tests showed that children in Schools A and B who received the syllable intervention over the 25 weeks made greater progress in their syllable awareness compared with the classes who received the extra synthetic phonic instruction. This progress was significant at $p < .05$ for A1.1, A1.3, A3.2, B1.3 and B2.3 with a mostly strong effect size. Whilst A3.1 and A3.3 (in both comparisons) also made greater progress in syllable awareness than their matched classes (2.05, 2.04 and 0.69 more on average respectively), the progress was not significant at $p < .05$ and this was corroborated by the standard error for each mean and a corresponding weak effect size.

At this point it is worth mentioning Dessemont and colleagues (2019) who highlight that the person administering the intervention can have a large effect on the progress made by participants. With that in mind it is important to stress to the reader that the class I taught (A1.1) made good syllable progress but this was surpassed by a Year One colleague (A1.3). Therefore, whilst some researchers can overstate the success of an intervention by underestimating their own impact (Suggate, 2014), I am in the fortunate position that my class did not make the biggest progress out of all of the comparison groups and therefore do not fall into this trap as easily.

The third and final step in this RQ was to analyse any causality between syllable awareness and reading and spelling development. In seven out of ten comparisons, the class who received the syllable intervention also progressed more with their reading. Similarly, in nine of ten comparisons, the class who received the syllable intervention also progressed more with their spelling. This progress for reading and spelling was, however, only significant at $p < .05$ for two classes. The other 18 comparisons were not significant. For each of the comparisons I presented the error bars which showed the overlapping standard error across these comparisons.

Consequently, the answer to this research question is that it was not possible to statistically prove that children in Years 1, 2 and 3 who follow a 25 week intervention

programme involving syllable segmentation skills progress more in their reading and spelling compared to a matched group who focus only on synthetic phonic skills.

(E) 4, Research Question two

First written August 2018, final edit August 2020.

Do children who have been taught syllable segmentation apply these skills to decoding and blending when reading and writing words?

E.4.1 Introduction

This RQ required both a quantitative and qualitative analysis. This is not an uncommon approach in a pragmatist/post-positivist approach to research (Creswell, 2018; Lor, 2011; Onwuegbuzie, 2000) whereby a researcher adopts a mixed methods approach in order to triangulate results (Cohen et al. 2011; Richards 2005; Mertler, 2017: 12). This RQ also allowed me to delve deeper into the research at a participant level (Tellis, 1997) and develop case studies which would home in on the data at a micro level (Bogdan and Biklen, 2007). These case studies were built by merging pre- and post-test data, an in-depth look into writing and reading samples and coded interview transcripts.

This section has four parts: (1) it will begin by outlining the participants for this case study, (2) share pre-test post-test data along with exploring writing and reading samples, (3) complement this with the qualitative data collected as part of the interview process and, (4) conclude by answering the question.

E.4.2 Participants

In School A, Year One the pre-test SRT and SWST scores were used to select 12 children to form case study participants. These 12 participants comprised three children from each of the four Year One classes. The three children in each class were randomly selected from a range of top, middle and bottom participants. This was done by choosing one child from each class which met the requirements pre-determined before the intervention (and common practice within School A) namely: (1) ‘top’ was defined as any child with a

reading/spelling age 0.80 years or more above their age, (2) ‘middle’ was a child with a reading/spelling age equal to their age ± 0.79 years and, (3) ‘bottom’ was defined as any child with a reading/spelling age 0.80 years or more below their age. Each child was given a code to ensure anonymity. The code is broken into: Child - School A Year One class number - number (1 for top, 2 for middle and 3 for bottom).

This particular RQ specifically focused on three children from A1.1 (Child 1.1, Child 1.2 and Child. 1.3) and three children from A1.3 (Child 3.1, Child 3.2 and Child 3.3). All children were British with only Child 1.2 identified as having English as an Additional Language (EAL). The average age of the six participants was 5.65 years thereby making them collectively one month older than the mean for Year One. Both Child 1.3 and Child 3.3 were flagged to the SEN department as having difficulties with learning but no formal learning assessment had taken place for each child.

E.4.3 Case study

Table E.4.3 below shows the data for the six case study participants. It includes the pre- and post-test data with progress indicated in brackets. It also includes a detailed analysis of exam scripts. For the SWST this was achieved by analysing the attempted spelling of each word in the SWST and checking it for syllabic or phonemic errors. For example if the word ‘*photographs*’ [fəʊtəgrɑːfs], was spelt ‘fotgrafs’ I marked this as a syllabic error as the child had spelt the word with two syllables as opposed to the correct three. Conversely, if the child had incorrectly spelt the word as ‘fotugrafs’ I would mark this as syllabically accurate as this would now have the correct number of syllables.

For reading I used the recording sheet from the PM Benchmark Reading Assessment (Scholastic, 2016) using the ‘Miscue-Analysis’. By looking at the teacher recording sheet I was able to ascertain how the children decoded unfamiliar words. For both assessments I took photocopies for each case study participant. Finally, I analysed the creative writing from each participant by looking at their ‘Big Write’ assessments (Wilson, 2016). For each piece I focused on the number of polysyllabic words the child used and whether they were syllabically accurate, irrespective of phonological accuracy.

Table E.4.3 Case Study Data

	Child 1.1	Child 1.2	Child 1.3	Child 3.1	Child 3.2	Child 3.3	Year One Mean	Case Study Mean
Age when starting 1st September 2016	5.667	5.083	5.083	6.083	5.833	5.917	5.583	5.653
Salford Reading Age - pre-test age, post-test age (progress)	10.083, 11.250 (1.167)	5.083, 7.583 (2.500)	4.750, 8.667 (3.917)	10.667, 11.000 (0.333)	5.583, 9.083 (3.500)	4.667, 8.083 (3.416)	6.51, 8.34 (1.83)	6.83, 8.96 (2.13)
Reading age minus age - pre-test age, post-test age (progress)	4.416, 4.833 (0.417)	0.000, 1.750 (1.750)	-1.333, 1.834 (3.167)	5.584, 5.167 (-0.417)	-0.250, 2.500 (2.750)	-1.250, 1.416 (2.666)	0.91, 1.99 (1.08)	1.18, 2.56 (1.38)
SWST Spelling Age - pre-test age, post-test age (progress)	8.417, 9.417 (1.000)	5.083, 6.667 (1.584)	5.083, 6.417 (1.334)	8.250, 8.500 (0.250)	5.083, 8.250 (3.167)	5.083, 6.500 (1.417)	5.80, 7.27 (1.46)	6.30, 7.61 (1.31)
Spelling age minus age - pre-test age, post-test age (progress)	2.750, 3.000 (0.250)	0.000, 0.834 (0.834)	-1.000, -0.416 (0.584)	3.167, 2.667 (-0.500)	-0.750, 1.667 (2.417)	-0.834, -0.167 (0.667)	0.20, 0.92 (0.71)	0.65, 1.21 (0.56)
Syllable - pre-test, post-test (progress)	17, 34 (17)	19, 27 (8)	7, 24 (17)	18, 34 (16)	7, 27 (20)	7, 29 (22)	10.66, 23.69 (13.03)	13.42, 24.50 (11.08)
SWST Syllabic Accuracy - pre-test, post-test (progress)	4, 5 (1)	1, 3 (2)	0, 1 (1)	4, 5 (1)	2, 3 (1)	0, 3 (3)	*na*	*na*
PM Reading Syllabic Accuracy - pre-test, post-test (progress)	2,4 (2)	1, 3 (2)	0, 2 (2)	0, 3 (3)	1, 2 (2)	0, 3 (3)	*na*	*na*
Big Write Syllabic Accuracy - pre-test, post-test (progress)	5, 14 (9)	1, 9 (8)	2, 5 (3)	7, 16 (9)	3, 11 (8)	2, 8 (6)	*na*	*na*

All six case study children made progress in syllabic awareness, reading and spelling. Five out of the six children made progress in syllabic awareness which was above the Year One mean with only Child 1.2 making progress which was below. Similarly, all children made progress in the SRT. In four cases this was above the Year One mean with both Child 1.1 and Child 3.1 making progress which was below the year mean, both in reading

years and taking age into account. This pattern was repeated with spelling with Child 1.1 and Child 3.1 making progress which was below the Year One mean in spelling years and taking age into account. Child 1.3 and Child 3.3 also scored below the Year One mean with spelling progress, but their progress scores were still more than Child 1.1 and Child 3.1.

When analysing the SWST answer sheet, all children increased their accuracy in spelling polysyllabic words. This increase was very small with four out of the six children only improving their polysyllabic accuracy by one. This same small difference was seen in the PM Syllabic Accuracy Test which shows that children used syllabic chunking two or three more times in the post test compared to the pre-test. With the Big Write assessments, greater syllabic accuracy was observed in spelling polysyllabic words for all children. In most cases this increase was almost threefold.

Analysis and Discussion:

To begin, it is of note that the one child (Child 1.2) who did not progress as much with their syllabic awareness was also the child with EAL. This child scored almost twice as much as the Year One mean in syllabic awareness in the pre-test and higher than any of the other five case study children. His central-European heritage and first language raises an interesting question about the importance of the orthographic structure of the language - although it is outside the scope of this thesis. This is because there is increasing research exploring the effect of syllabic structures within different languages (Alvarez et al., 2001; Mathey and Zagar, 2002).

It is also interesting to note that both Child 1.1 and Child 3.1 have reading and spelling ages exceeding their actual age. This is significantly above the Year One mean in both tests and whilst they remain significantly above the mean in terms of post-test scores, their progress is noticeably less. This closer look at the data was missing in RQ1 and possibly suggests a plateau effect in both reading and spelling progress. This levelling off may be natural as children progress through the Mini-Milestone, or may indicate a shortcoming in the assessments that they cannot adequately account for higher achieving children and their subsequent progress.

The analysis from the Big Write does indicate greater syllabic accuracy in spelling polysyllabic words in the post-tests by almost threefold. This does, however, not necessarily mean that the increased number of polysyllabic words can be credited to the intervention and furthermore this section is not trying to prove any causality. The increase in polysyllabic words could be because the children have matured and consequently are more capable in writing longer words. When reading the 'Big Write' assessments, the polysyllabic words were not always spelt phonemically correctly, but what interested me was twofold: First and foremost, children were using words which could have been replaced by a shorter synonymous word. For example Child 1.3 wrote '*forest*' instead of the more common 'wood' and Child 3.2 used the word '*fritening*' (frightening) instead of 'scary'. Second, children were including more middle sounds which made the words more plausible to read. For example in the pre-test, Child 1.2 scored one, not because he only attempted one word, but because the other examples were syllabically inaccurate. The post-test writing samples showed me that Child 1.2 was increasingly thinking about all the chunks of the word. This is highlighted later in this section when analysing the transcripts.

The data from the in-depth analysis of the PM Reading Assessment and SWST assessments does not reveal much. The difference in pre- and post-test is not large enough to detect any discernible patterns. A closer look at the spelling answer sheet supports this. With the exception of Child 1.3, the remaining five children all improved their accuracy in spelling polysyllabic words, with all five spelling '*football*' correctly with the consonant 't' and '*rabbit*' including both middle consonants. The most common syllabic strategy adopted was to split words in half in the hope that they were compound words. This did not always work but specific examples where it did were: (1) sand.castle (Child 1.3), (2) tool.box (Child 3.3) and, (3) toy.shop (Child 3.2). Another finding from the reading analysis was that children used the suffix rule to help them. Specific examples include boys decoding words by compartmentalising the 'tion' in 'competition', or the 'cious' in 'ferocious'. This was particularly the case for Child 1.1 and Child 3.1 who were in the top end of the books and were faced with complex unfamiliar words.

Ultimately, whilst the increase in the number of syllabic strategies might be expected due to maturation and naturally encountering more polysyllabic words, this analysis nevertheless reveals how children use syllabic strategies to support their decoding and segmenting of words.

E.4.4 Interviews

The initial assessment analysis showed that children were using syllable segmentation skills to help them decode and segment words. To build a comprehensive understanding of the effect the intervention had, I explored the transcripts from the post-test interviews to see if they could shed any further light on how syllable strategies were being used. I colour coded all post-test transcripts in red to make this analysis easier to follow. Below are examples which support the arguments made in this section. I have subdivided them into reading and spelling. Transcripts E.4.4.1 and E.4.4.2 are examples where children talk about syllables in terms of helping them segment words to aid with reading:

Transcript E.4.4.1 Child 1.3 Syllables and Reading

73	Me	So, […]. Thank you for sharing your favourite books, I will certainly look at them. Can I […] urm, move onto reading, do you do anything to help you read long words, especially if you haven't seen them before?	
74	Child 1.3	You can try and find the different syllables. Easier to say it. That's what we do when I read with my little brother and read at home with my nanny.	PN£ S1L ++ C0?
75	Me	Interesting, do you enjoy breaking words into syllables?	
76	Child 1.3	Ye, [...]. My brother does robot arms.	PN£ S1L ++ C0?

Transcript E.4.4.2 Child 3.1 and Child 3.2 Syllables and Reading

90	Me	So moving onto reading, is there anything you do to help you read long words you haven't seen before?	
91	Child 3.2	Syllables.	PN£ S1L
92	Me	How could you use syllables?	
93	Child 3.1	Chunk the word up?	PN£ S1L
94	Me	Could you give me an example of when you use chunking to help you read?	
95	Child 3.2	'Transporter'	
96	Me	So how would you break up 'transporter'?	
97	Child 3.1	[...] urm, 'trans / por / ter'.	PN£ S1L

Moving onto spelling, there were more examples in the post-test interviews where children discuss syllables in helping them blend words for spelling. Transcript E.4.4.3 are extracts taken from a longer transcript of an interview with the three children from Class A1.3. In this transcript the children discuss the various strategies they use:

Transcript E.4.4.3 Class A1.3 discussing syllables and spelling

92	Child 1.1	Syllables help me.	PN£ S1L
93	Me	How interesting	
94	Child 1.3	Syllables help me too.	PN£ S1L
95	Me	Oh wow, you think so too.	
96	Child 1.3	Ye, syl / la / bles [breaks syllables into syl / la / bles as a joke].	PN£ S1L ++ C0?
97	Me	[Laugh] syl / la / bles.	
98	Child 1.1	[Interrupts] it's when you break words into lots of different things.	
99	Me	Things?	

100	Child 1.1	Well, [...] not lots of little things, only the bits that it can be broken into so 'dinosaur' is: 'di / no / saur'.	PN£ S1L ++ C0?
101	Me	[Laugh] yes I don't think I could, urm [...] explain that any better [...]. Thank you [Child 1.1]. [Child 3.1] do you use syllables?	
102	Child 3.1	Ye, [...] I do.	PN£ S1L
103	Me	You do [...]? How do you use syllables to help you?	
104	Child 3.1	I, urm [...], I urm [...], spell each bit and then put it, urm [...] glue it together.	PN£ S1L ++ C0?

Deleted superfluous text

108	Child 3.3	I do 'robot arms' or 'hands under the chin', urm [...] and [...].	PN£ S1L ++ C0?
109	Me	Wow, those are great ideas.	
110	Child 3.2	I also clap.	PN£ S1L

Deleted superfluous text

112	Child 3.3	Urm, [...] it's just, [...] urm, it's just my mum asks how many syllables [...] I just count and that helps me with my spelling.	PN£ S1L

Deleted superfluous text

115	Me	How do syllables help you with your spelling?	
116	Child 3.2	Urm, [...] with 'monkey'.	
117	Me	Yes? [...] how would you break the word monkey into syllables?	
118	Child 3.3	[Holds two fingers].	PN£ S1L
119	Me	[Laughs] yes two syllables, but what are the chunks?	
120	Child 3.3	'Mon / key'.	

Analysis and Discussion:

When it comes to reading, the idea of 'chunking' recurs as a useful strategy for helping children decode text. Child 3.1 in the second example is far more explicit and refers to it

by name and explains how he could use his knowledge of syllables to chunk ‘transporter’ into three syllables ‘trans/por/ter’. This short extract ties in with the literature presented by Ehri (2005) that it is much easier to recall words from memory using larger chunks, reducing the connections stored in memory.

Out of the two examples, the first is perhaps more applicable as an insight into reading strategies. Here, Child 1.3 does not refer to the skill by name, but what he does do is describe how he decodes text using syllables. By slowly reading the word using ‘*Robot Arms*’ he is able to work his way through the unfamiliar word. ‘Robot Arms’ is a particular teaching method which features numerous times in the intervention handbook and perhaps therefore it is of little surprise that Child 1.3 refers back to this within the interview.

When collating the applicable sections from the transcripts I noted that there were more examples where children mention syllables with regard to spelling as opposed to reading. I found this an interesting observation as reading was a skill which seemed, at least in the data analysis for RQ1, a skill which children performed better on. The natural increase in occurrences where children discuss spelling strategies as opposed to reading strategies may reflect an unplanned outcome of this RQ that phonic tools are more useful for children with spelling than they are for reading. This is explored in subsequent RQs.

Finally, in all the spelling examples, the reference to spelling is always in relation to counting the number of syllables. This, like the ‘Robot Arms’, relates to a specific strategy taught in the intervention which encouraged children to follow three steps to spelling unfamiliar polysyllabic words: (1) Count the number of syllables, (2) spell each of the syllables separately and, (3) blend it together. In all the examples in the transcript the children refer to step one, whilst there are not many examples in the transcript of children discussing steps two and three apart from Child 3.1 who summarises the final step as simply: “[…] glue it together”.

E.4.5 RQ2 answer

Do children who have been taught syllable segmentation apply these skills to decoding and blending when reading and spelling words?

This question required a mixed methods approach which allowed me to triangulate the results (Creswell, 2018; Cohen et al. 2011; Richards 2005). I focused on six case study participants as a way of 'funnelling' my research (Bogdan and Biklen, 2007). The first part of this section analysed the data from six case study children in pre- and post-test assessments. The analysis was informative, both in its ability to delve deeper and question whether the SWST and SRT were inherently limiting for higher ability children to make progress, as appears to be the case with Child 1.1 and Child 3.1. If so this would impair the analysis of average progress as seen in RQ1.

Another interesting observation was the link between the highest pre-test syllable score being achieved by the one child who had EAL. Whilst out of the scope of this thesis it does raise further questions as to the effect language structure has on syllabic sensitivity. Regarding the more thorough analysis of the SWST answer sheet and PM Reading Assessment, whilst initially the differences in pre- and post-test examples were too small to analyse, specific examples demonstrated how children were using syllables constructively to support themselves with decoding and blending. Whilst no causal link can be established, this culminated in a noticeable increase in the number of attempted polysyllabic words in the Big Write assessment.

The second part of this RQ analysed some of the sections of transcript from the post-test interviews which focused on reading and spelling. Whilst the data presented suggested that Year One children had a higher reading age compared with spelling, both in scores and progress, I noted that there were more incidences of syllables and spelling than syllables and reading. With regard to spelling, in almost all the examples, children were referencing the three steps to syllabically spell words which were taught in the handbook. I noted that this may in fact show that the usefulness of syllables is greater for spelling. Having said this, the transcripts suggested that using syllables for reading was a tool to help break words down into chunks, which ties in with the argument that bigger

orthographic units are easier to recall from memory than using every individual phoneme (Ehri, 2005).

Consequently, to answer the RQ, by adopting a case study approach, I have been able to identify examples where children who received the syllable intervention applied those skills in reading and spelling tasks. It is, of course, important to stress that I acknowledge that I cannot be certain that these examples are as a direct result of the intervention. Nevertheless, I believe they shed an interesting light on how syllables are used by children in segmenting and blending tasks. The next RQ continues this qualitative strand to my research.

(E) 5, Research Question three

First written August 2018, final edit August 2020.

What are children's views about learning syllable segmentation? What are teacher's views about teaching syllable segmentation?

E.5.1 Preamble

This section will explore the views of children and teachers regarding the intervention. To do this, extracts from interview transcripts will be presented. For ease of reference, all pre-test interviews are colour coded in yellow and all post-test interviews are colour coded in red. Each child was given a code to ensure anonymity. The code is broken into: Child - School A Year One class number - number (1 for top, 2 for middle and 3 for bottom). Teachers were given the code: Teacher - School - Year - number.

E.5.2 What are children's views of syllable segmentation?

The first step in analysing children's attitudes towards syllable segmentation was to count the number of times each of the codes (as presented in table D.2.3) appeared for all of the interviews during the pre- and post-tests (for more information on *how* I coded please see sections D and E). I used a computer search function to locate and add each code. Below is table E.5.2.1 listing the total number of times each code appeared for each of the four Year One classes. This is broken into pre- and post-test as well as overall progress in brackets:

Table E.5.2.1 Autumn 2016 Interviews, No. of Times

Theme	Code	Syllable			Synthetic Phonics		
		A1.1	A1.3	Total	A1.4	A1.2	Total
positive confidence pre-, post-test (progress)	++ C0?	2, 8 (6)	0, 8 (8)	2, 16 (14)	2, 3 (1)	0, 0 (0)	2, 3 (1)
negative confidence pre-, post-test (progress)	-- C0?	3, 4 (1)	1, 4 (3)	4, 8 (4)	0, 5 (5)	2, 3 (1)	2, 8 (6)
positive spelling pre-, post-test (progress)	++ S=G	4, 4 (0)	12, 6 (-6)	16, 10 (-6)	6, 1 (-5)	5, 3 (-2)	11, 4 (-7)
negative spelling pre-, post-test (progress)	-- S=G	10, 7 (-3)	0, 3 (3)	10, 10 (0)	4, 6 (2)	5, 2 (-3)	9, 8 (-1)
positive reading pre-, post-test (progress)	++ B0<	5, 5 (0)	4, 8 (4)	9, 13 (4)	5, 8 (3)	5, 6 (1)	10, 14 (4)
negative reading pre-, post-test (progress)	-- B0<	1, 0 (-1)	1, 5 (4)	2, 5 (3)	2, 8 (6)	0, 1 (1)	2, 9 (7)
syllable pre-, post-test (progress)	S1L	0, 9 (9)	2, 11 (9)	2, 20 (18)	0, 0 (0)	0, 0 (0)	0, 0 (0)
phonic strategies pre-, post-test (progress)	PN£	3, 10 (7)	4, 17 (13)	7, 27 (20)	4, 6 (2)	4, 4 (0)	8, 10 (2)

Syllables, in any capacity, are not mentioned by any of the classes in the pre-test interviews apart from A1.3 where they are mentioned twice by the same child (Child 3.1). Transcript E.5.2.2 below shows how this occurs:

Transcript E.5.2.2 Child 3.1 Pre-test syllables

47	Child 3.1	If you find urm [...] something write, urm, [...] you could spell it out with syllables.	PN£ S1L
48	Me	Urm, that's really interesting. How would you do that?	
49	Child 3.1	You could, clap, you could speak like a robot, or you could put your hand under your chin. Like this. Sun-set [Child 3.1 puts his hands under his chin and elongates the word to show me his chin is touching his hand when saying the word sunset].	PN£ S1L

Syllable segmentation is otherwise not mentioned, despite me asking all the classes if there are any additional strategies which they could use to help them with reading and spelling other than phonemes. This is perhaps not surprising as the literature review already suggested that syllable segmentation is not included under the statutory requirements in the National Curriculum for Year One (DfE, 2013), nor features in the Primary National Strategy Framework for Literacy (DfE, 2006), or in popular phonic schemes (for example *Letters and Sounds* (DfE, 2007), *Read Write Inc.* (Miskin, 2006) and *Jolly Phonics* (Lloyd and Wernham, 2010). Instead, synthetic phonics remain the most popular discourse in KS1 phonics teaching and this is reflected in the pre-test transcripts. Transcript E.5.2.3 are the responses from various case study children to the same question: 'Is there anything you can think of that might help you read/spell?' In all of the examples, children reference synthetic phonic strategies, such as 'sounding out' and 'dots and dashes':

Transcript E.5.2.3 Pre-test phoneme awareness

72	Me	That's quite right. Is there anything you can think of that might help you read? Is there anything you can think of that might help you spell?	
73	Child 1.3	Dots and dashes.	**PN£**
		Interview question removed	
48	Child 4.2	Sounding words out.	**PN£**
		Interview question removed	
52	Child 3.3	Use your sounds?	**PN£**
		Interview question removed	
87	Child 4.3	I sound it out [...] but it doesn't always work.	**PN£**
		Interview question removed	
38	Child 2.1 Child 2.2 Child 2.3	Sound things out.	**PN£**

In June 2017 the syllable group mentioned the word 'syllable' 18 times more than in the autumn interviews. Conversely, the word syllable was not mentioned by the synthetic

phonic group at all with the exception of Child 4.2 who said the following when discussing strategies to help him with his reading and spelling:

Transcript E.5.2.4 Child 4.2 Syllable Awareness

33	Child 4.2	Ye, [...] spelling 'impossible' and you, [...] like kind of, [...] like you spell it 'imposs/i/ble'.	PN£ S1L -- S=G -- C0?

Returning to the syllable group, children used the word syllables in various contexts. I have listed the pertinent extracts from the interviews below. Transcript E.5.2.5 is from Class A1.1 and Transcript E.5.2.6 is from Class A1.3:

Transcript E.5.2.5 Class A1.1 Post-Test Syllable Awareness

74	Child 1.2	You can try and find the different syllables. Easier to say it. That's what we do when I read with my little brother and read at home with my nanny.	PN£ S1L ++ C0?
75	Me	Interesting, do you enjoy breaking words into syllables?	
76	Child 1.2	Ye, [...]. My brother does robot arms.	PN£ S1L ++ C0?

Deleted superfluous text

92	Child 1.1	Syllables help me.	PN£ S1L
93	Me	How interesting.	
94	Child 1.3	Syllables help me too.	PN£ S1L
95	Me	Oh wow, you think so too.	
96	Child 1.3	Ye, syl / la / bles [breaks syllables into syl / la / bles as a joke].	PN£ S1L ++ C0?
97	Me	[Laugh] syl / la / bles.	
98	Child 1.1	[Interrupts] it's when you break words into lots of different things.	
99	Me	Things?	

100	Child 1.1	Well, [...] not lots of little things, only the bits that it can be broken into so 'dinosaur' is: 'di / no / saur'.	PN£ S1L ++ C0?
101	Me	[Laugh] yes I don't think I could, urm [...] explain that any better [...]. Thank you [Child 1.1]. [Child 3.1] do you use syllables?	
102	Child 3.1	Ye, [...] I do.	PN£ S1L
103	Me	You do [...]? How do you use syllables to help you?	
104	Child 3.1	I, urm [...], I urm [...], spell each bit and then put it, urm [...] glue it together.	PN£ S1L ++ C0?

Transcript E.5.2.6 Class A1.3 Post-Test Syllable Awareness

84	Child 3.2	Little words that are hiding in words.	PN£

Deleted superfluous text

91	Child 3.2	Syllables.	PN£ S1L
92	Me	How could you use syllables?	
93	Child 3.1	Chunk the word up?	PN£ S1L
94	Me	Could you give me an example of when you use chunking to help you read?	
95	Child 3.2	'Transporter'	
96	Me	So how would you break up 'transporter'?	
97	Child 3.1	[...] urm, 'trans / por / ter'.	PN£ S1L

Deleted superfluous text

108	Child 3.3	I do 'robot arms' or 'hands under the chin', urm [...] and [...].	PN£ S1L ++ C0?
109	Me	Wow, those are great ideas.	
110	Child 3.2	I also clap.	PN£ S1L

Deleted superfluous text

112	Child 3.3	Urm, [...] it's just, [...] urm, it's just my mum asks how many syllables [...] I just count and that helps me with my spelling.	PN£ S1L

Deleted superfluous text

115	Me	How do syllables help you with your spelling?	
116	Child 3.2	Urm, [...] with ‘monkey’.	
117	Me	Yes? [...] how would you break the word monkey into syllables?	
118	Child 3.3	[Holds two fingers].	**PN£** **S1L**
119	Me	[Laughs] yes two syllables, but what are the chunks?	
120	Child 3.3	‘Mon / key’.	

Having reflected on these examples, the following subcategories formed themselves. I believe that these subcategories are the attitudes which children in the syllable group have towards syllable awareness. I have listed these subcategories in table E.5.2.7 below and referenced how they relate to the sections of transcript above:

Table E.5.2.7 Children's Views of Syllable Segmentation

My assumption	Reference to the examples above	
	Colour	Number
Syllables are something that can be heard, it is innate and detectable.	Yellow	49
	Red	74
	Red	108
	Red	110
	Red	112
Syllable awareness is a skill which can be used to break words down into chunks for reading.	Red	74
	Red	84
	Red	93
	Red	95
	Red	97
By counting syllables children are able to spell polysyllabic words with greater ease.	Yellow	47
	Red	100
	Red	104
	Red	112
	Red	120
Children understand that chunking words into syllables is a larger unit than phonemic chunking.	Red	84
	Red	93
	Red	120
Syllables are fun. In other words, the teaching of syllable segmentation was positive.	Yellow	49
	Red	76

Analysis and Discussion:

There are several things to note about the data presented. First and foremost it must be noted that the pre-test interviews took place one week after the intervention began. This was by no means intentional, but unforeseen circumstances forced me to delay the interviews by one week. It is, therefore, interesting to note that Child 3.1 had either

already known about syllables or had absorbed the first week already and mentioned it in the pre-test interviews.

The post-test coding data suggests that the children in the syllable group became more conversant with syllables. Furthermore, the interview transcripts would show that this is not just in terms of knowing the word but also in terms of understanding *how* syllables can benefit them with reading and spelling. Allott (2019), as well as Cordewener and colleagues (2018), express the importance of metacognitive approaches to spelling; the idea that spelling ability increases if one reflects critically on the processes involved. We can see that the converse is true for the synthetic phonic group. Whilst the post-test coding suggests that their syllabic awareness did not improve, we are not sure whether this is because their syllabic awareness had not increased or whether it was simply because they were unaware of the terminology. The transcript from Child 4.2 would argue the latter and so would the data from RQ1 which showed that children who did not receive the syllable treatment still improved their syllabic awareness over the 25 weeks. Having said this, the argument that unless taught, it remains an unused skill (Bhattacharya and Ehri, 2004) is still pertinent when we consider the fact that the case study children from the synthetic phonic group cannot name any additional decoding strategies other than phonemes. Even Child 4.2, whilst he shows some syllabic awareness, clearly does not know what it is and neither does he chunk it correctly into syllables. Colleagues and I viewed this as an example where syllable segmentation skills need to be learnt. Whilst his attempt at ‘imposs/i/ble’ was perhaps an innate desire to simplify the decoding and segmenting process by reducing the number of units (Ehri, 2005), it also shows that children cannot be expected to segment words correctly into syllables by themselves.

E.5.3 What are teachers’ views of teaching syllable segmentation?

Before beginning, it is important to stress that I did not interview every member of staff involved in teaching the syllable intervention. Five staff were involved in teaching the syllable intervention in School A and I interviewed three of them (Teacher A1.3, Teacher A3.2 and Teacher A3.3). I was the fourth (Teacher A1.1) and my reflections are in section F. The fifth member of staff did not volunteer. In school B I interviewed my School B

contact (Teacher B1.3) and the Year Two teacher (Teacher B2.3). These five staff all volunteered and I adopted 'member checking' to ensure greater credibility and transparency (Mills, 2011). It must be noted that the data was not collected in order to make any generalisations - for example I was not interested in whether their responses would conform to what the literature suggested about teachers not being entirely confident in how to teach syllables (Duanmu, 2009; Bhattacharya and Ehri, 2004; Henderson, 1985). Instead I was predominantly interested in how teachers felt teaching the intervention material. With that in mind, I sought their honest feedback in the post-test interviews about their reflections on finishing the intervention and several themes emerged which I have tabulated in Table E.5.3.1 below:

Table E.5.3.1 Teacher's Interview Themes

	Teacher A1.3	Teacher A3.2	Teacher A3.3	Teacher B1.3	Teacher B2.3
Enjoyed teaching the intervention.	✔	✔		✔	✔
The ease with which they were able to do the activities.		✔	✔	✔	
Mention their own professional development.	✔	✔		✔	✔
Mention seeing children use it in class/reading/spelling.	✔			✔	
Worth continuing into the new year.	✔	✔	✔	✔	✔
Frustrated by the intervention (E.g. that some of the games segmented syllables incorrectly or that some resources were not British-English).		✔	✔		✔
Question parental understanding.			✔		

All teachers, with the exception of Teacher A3.3, said they enjoyed teaching the intervention. It must be noted that Teacher A3.3 did not say she disliked teaching syllables, simply when asked she responded with:

Transcript E.5.3.2 Teacher A3.3 Ease of Activities

39	Me	So how did you find teaching the intervention this year?	

40	Teacher A3.3	Ye, […] urm […] [laughs] I found the activities easy to follow. The powerpoint slides really helped. […] urm, I thought the games where they had to break up the words on post-it notes was useful as it was really visual you know.	S1L

Conversely, I am well aware that the positive feedback from the other four members of staff cannot be interpreted as conclusive evidence, as my colleagues were unlikely to tell me to my face that they did not like the intervention. This is something I return to in section G when I explore the reality of AR in an educational setting. Nevertheless, I was interested in how the teachers found the practicalities of carrying out the intervention and similar to Teacher A3.3, Teachers A3.2 and B1.3 both mentioned the ease with which they could carry out the activities.

Transcript E.5.3.3 Teacher A3.2 Ease of Activities

51	Teacher A3.2	I have to say […] having the activities in alphabetical order really helped. It was easy to scan when the boys were coming in from break. I really don't like scrolling through PDFs online […] [laughs] so, ye […] it helped. […] I need a new copy though as mine is on its last legs [laugh].	S1L

Transcript E.5.3.4 Teacher B1.3 Ease of Activities

29	Teacher A3.3	I thought using a mirror was great […] really great. I have seen that done for 'f' and 'th' with phonics but the boys and girls loved it [laughs]. Not sure if that was mostly because they enjoyed looking at themselves though [laughs].	S1L

With the above in mind, it was of course noteworthy that several external activities included within the intervention were not entirely accurate. This is mentioned by three teachers, all in the older year groups who were focusing on the harder levels of the online games compared to Year One. Furthermore, Teacher A3.3 mentioned an interesting further hurdle which I had not yet considered which was:

Transcript E.5.3.5 Teacher A3.3 Parental Difficulties

107	Teacher A3.3	I mean […], urm, […] have you, […] I am sure you have considered this but […] considering the challenge we have in getting parents to say the sounds correctly, […] you know […] without the schwas, what do you think the likelihood is that parents could support our boys with this at home?	S1L
108	Me	Oh wow, […], urm […] [laughs], urm […] that's a really good point, I really do not know the answer to that.	

My response was genuine, that at the time I really did not know how parents would find supporting children with syllable segmentation at home. Upon reflection, however, I feel that because syllables are a natural part of speech (Leong and Goswami, 2014; Mehta et al., 2018; Hartas, 2006; Choi et al., 2017), at least more than phonemes, it would be an easier concept to teach when we bring parents into school and explain synthetic phonics. It was, nevertheless, something I had not considered and something I actively prepared when I met the new KS1 parents in September 2017.

Finally, part of the reason for involving colleagues in this AR was the idea of 'empowering' staff (Hine and Lavery, 2014; Ripamonti et al., 2015). It was, therefore, pleasing to read that the teachers all mentioned their own improvement professionally. This was not only in their ability to reflect on their own practice (Morales, 2016; Holter and Frabutt, 2012; Clauset, et al., 2008) but they genuinely felt they gained new understanding. For example:

Transcript E.5.3.6 Teacher A1.3 Learning something new

84	Teacher A1.3	You know, […] I really did not know that about short vowels and then the consonant after. And you know sometimes it feels odd, and wrong when you say it, you know […] demonstrate it slowly, but then when you really think about it, it feels right […]. But it does make you think […] whether we chop it wrong, […] you know if we don't think about it and just break it quickly.	++

Transcript E.5.3.7 Teacher B2.3 Learning something new

57	Teacher B2.3	I must admit that I was having to teach myself by looking at the Flipchart Monday morning.	++

Ultimately, every teacher said that they were going to incorporate syllables more into their teaching. Obviously time would tell and the second cycle would slightly force their hand in this matter regardless. What was interesting, however was two teachers (Teacher A1.3 and Teacher B1.3) mentioning how they saw children in their class put their hand underneath their chin when trying to spell words in class, something which they noted they had not seen in previous years:

Transcript E.5.3.8 Teacher A1.3 Syllable Strategies

51	Teacher B1.3	I knew it was making a difference when I saw [*name omitted*] put his hand under his chin and make these enormous mouth movements trying to spell a word. Didn't see the word mind you as I was at my desk but it was great to see!	++ S=G PN£ S1L

Analysis and Discussion:

Whilst I have already included some analysis within my discussion, I do think there are some important issues worth exploring further. First and foremost, was the reported ease with which teachers could implement the material. Whether that was the usefulness of the PowerPoint presentations, or the simple fact that the activities were in alphabetical order, it helped me think about the good practice I would continue for the subsequent cycle and what I could further improve. For example, for the second cycle I wanted to create every lesson on a PowerPoint regardless of whether it was teaching a rule or simply outlining the task for the day. This was because the feedback from staff focused on how it helped to have the material set out in front of them.

Second, I was particularly pleased with the way teachers fed back their frustration regarding some of the games. This was because it showed me that teachers had internalised the various syllable rules (as defined by Stone (2012), Duanmu (2009) and

Snowing and Stackhouse (2001)) and were now able to apply that knowledge to critiquing external teaching materials. This level of understanding can only be beneficial. Returning to the actual specifics of the the errors in the games I found this surprisingly reaffirming. This was not because I was pleased with myself for not having checked the games thoroughly (I had tested each game but the children in the older year groups were on levels I had not fully checked) but rather because it showed me that this lack of clarity over syllable breaks in polysyllabic words was a genuine issue at all levels of education, from child through to educational publishers.

Whilst of course I was delighted that all staff were keen to continue teaching syllables in the future, I was perhaps more excited by the professional development this intervention had caused. This was, as mentioned above, not just in a holistic improvement in their overall engagement in educational research and thereby creating a wealth of knowledge (Cain, 2019; Mercer, 2000), staff were also improving their specific understanding of syllables. As shown in the example above where teachers critiqued online games, it was also pleasing to read in transcripts that staff were learning new information, questioning that which they had taken for granted, even if it was as simple as questioning whether a consonant belongs to the first or second vowel. As Allott (2019: 106) writes:

> "*Teachers need a deep understanding of how the language works to teach it effectively*."

Whilst the interviews with staff were purely anecdotal, they contributed enormously to the overall understanding of the 25 week intervention, and perhaps more importantly, how teachers in Schools A and B will continue to teach phonics after the intervention has finished.

E.5.4 RQ 3 answer

What are children's views about learning syllable segmentation? What are teacher's views about teaching syllable segmentation?

Ultimately, for RQ3 the most important analysis in terms of understanding children's views about learning syllable segmentation was subcategorising the syllable responses. What became quickly apparent was the number of times syllables were referred to as something you could 'hear'. Much of the first term in the intervention material was focused on 'hearing' syllables, so these examples could simply be a reflection of what children had been taught. Conversely, if children are referring to hearing syllables and 'robot talking' then they are not only understanding syllables but they are also appreciating that they are part of natural rhythmic stress when speaking which ties in with the literature on prosody. Finally, I feel it is important to highlight that children's views of syllables are not mentioned begrudgingly; syllables are referred to as fun, so much so that in one case they taught their younger sibling. Having an element of 'fun' was something which was enormously important in a KS1 aimed intervention and therefore I am glad this shone through in the interviews.

With respect to the teachers who taught the syllable intervention, the AR encouraged them to reflect, and question their current practice (Morales, 2016; Holter and Frabutt, 2012; Clauset, et al., 2008). The post-test interviews suggested that overall phonics practice had improved for all teachers by encouraging staff to engage more in what they were doing and why. The intervention encouraged staff to be a part of constructing knowledge (Ripamonti et al., 2015). On a more practical level, the interviews with staff at the end of the intervention helped inform me for the second cycle. Staff gave me valuable feedback on the activities which worked less well/were not correct and highlighted the aspects which were useful. Furthermore, all staff were convinced by the importance of continuing with syllables beyond this year and spoke positively about aspects of their own understanding which had improved as a result of following the intervention.

(E) 6, Research Question four

First written August 2018, final edit August 2020.

Are there any differences between individuals or groups of children in their receptiveness to a syllable segmentation programme, according to their prior learning and any specific learning difficulty?

E.6.1 Introduction

In the literature review I argued that teaching syllable awareness could have the following four benefits for all children: (1) it reduces cognitive load by reducing the number of connections from print to memory, (2) onset and rime patterns help the individual learn common phonetic patterns, (3) syllable awareness is an important first step in phonetic development due to its hierarchical structure and, (4) if syllable awareness develops naturally in the pre-school phase, why stop teaching it only to recommence it after phonemic instruction has taken place? I argue further that for children who find reading and spelling difficult, teaching syllable awareness may have additional benefits. This is for two main reasons:

First, linked with point (1) above, synthetic phonics may be holding some children back. This stems from the idea that children who find reading and spelling difficult often have poor recall (Marther and Wendling, 2012; Reid, 2009; Snowling and Stackhouse, 2001) and therefore their short-term memory is less well-equipped to retrieve all the necessary phonemes from memory in order to segment words effectively. This links with Ehri (2005) who writes about the benefits of reducing the connections from print to memory and is supported by research carried out by Tarraran (2018) who noted that children who received a syllabic intervention significantly improved their reading compared to those who did not receive the intervention.

Second, there might also be a specific syllabic difficulty faced by children who find reading and spelling difficult. Consequently, withholding this useful tool which many other children access subconsciously may disadvantage those who struggle with reading and spelling.

Over twenty years ago, Hulme and Snowling (1997) showed that dyslexic children performed less well on syllable awareness tests compared with chronological age matched controls. This has since been supported by Peterson and Pennington (2012) and Leong and Goswami (2014) insofar as children with specific learning difficulties have a particular difficulty with syllables. It is thought that this difficulty stems from a reduced sensitivity to detecting amplitude modulation in stressed and unstressed syllables (Mehta et al., 2018; Leong et al 2011; Holliman et al, 2008). This can have a knock on effect to further phonological understanding due to phonological hierarchy (Brady and Shankweiler, 2013; Treiman, 2013; Zieger and Goswami, 2005; Goswami, 2003).

Consequently, this RQ was shaped by wanting to contribute to this growing literature. Having said this, most of the literature reviewed refers explicitly to 'dyslexia', which this RQ (as outlined in section B) will avoid. Therefore, I will use my own criteria based off what already exists in School A for establishing which children are at risk of literacy difficulties and analyse their receptiveness to the intervention. The reason for using these criteria is because I am not seeking to generalise my findings and, in line with AR, accept that the criteria for having a difficulty with literacy will almost certainly look different in Schools A and B as high achieving independent Prep schools compared with other schools. Consequently, through numerous conversations with colleagues and members of the SEN department the following criteria arose:

		Reading age below actual age by more than	Spelling age below actual age by more than	Total reading and spelling ages below actual age by more than
School A	Year One	0.750 years	0.250 years	1.100 years
	Year Three	0.00 years	0.00 years	0.00 years
School B	Year One	0.750 years	0.250 years	1.100 years
	Year Two	0.500 years	0.100 years	1.000 years

As will be instantly apparent the criteria for each year group are different. To create the criteria we worked from Year Three backwards. In Year Three the mean pre-test reading age was 2.17 years above their age. The average spelling age was 0.66 years above their age. The combined reading and spelling ages were therefore 2.83 years above their actual age. Consequently it was decided that any child who had a reading, spelling or combined age 0.00 years or below was potentially at risk of literacy difficulty. Of course

this would not be the case in all schools, but this decision was taken for Schools A and B because of their particular context. Both schools were selective high-achieving Prep schools which aimed to work a year ahead of their age (as reflected in mean scores). Consequently, a reading and spelling age of 0.00 years or below represented a child who was not working at the same level as their peers. With each lower year group (Year Two in School B and then the two Year One classes) the criteria broaden. This reflects the fact that reading and spelling is a developmental process whereby children learn literacy skills at different rates (Rose, 2007). Consequently, a below reading or spelling age is not always indicative of a difficulty with literacy. This is also clear in the average scores for Year One which have a combined reading and spelling age above actual age of 1.11 years. Consequently the threshold of 1.100 below remains similar to Year Three in being two years below the mean.

This RQ is broken into two parts: First, I was interested in whether children who were identified as being at risk of reading and spelling difficulties found syllable segmentation harder than their peers. This involved a comparison of pre-test syllable scores. Second, do children who have a difficulty with reading and spelling make more progress following the syllable intervention than children who have a difficulty with reading and spelling but follow the synthetic phonic treatment? This second part to the question refers back to the original objective at the beginning of this research, namely to find strategies to help children who find reading and spelling difficult. To answer this I used the Mann-Whitney U-Test to check the significance of each comparison as well as calculate the effect size and power.

E.6.2 Pre-test syllable awareness

The first step was to see whether, as the literature suggests (Hulme and Snowling, 1997; Peterson and Pennington, 2012; Leong and Goswami, 2014; Holliman et al, 2008), children who find reading and spelling difficult also have difficulties with syllables. To do this, pre-test syllable scores for children identified as having a difficulty with literacy were compared with pre-test syllable scores for children who did not have an identifiable difficulty. This was done within each year group. The data is presented in table E.6.2 below:

Table E.6.2 Literacy Difficulty and Pre-Test Syllable Awareness

	School A				School B			
	Year One		Year Three		Year One		Year Two	
	Literacy Difficulty	Non-Literacy Difficulty	Literacy Difficulty	Non-Literacy Difficulty	Literacy Difficulty	Non-Literacy Difficulty	Literacy Difficulty	Non-Literacy Difficulty
n	22.00	51.00	9.00	80.00	7.00	27.00	9.00	34.00
Mean Pre-test Syllable Assessment Score	7.77	11.86	21.22	25.40	9.29	10.52	12.89	17.97
STDEV	4.29	6.55	3.15	4.53	5.09	5.56	2.80	5.37
STERR	0.91	0.92	1.05	0.51	1.92	1.07	0.93	0.92
Sum of ranks:	599.50	2101.50	172.00	3833.00	112.50	482.50	104.50	841.50
Mean of ranks:	27.25	41.21	19.11	47.91	16.07	12.87	11.61	24.75
U-value:	775.50	346.50	593.00	127.00	104.50	84.50	246.50	59.50
Sum of ranks:	2701.00		4005.00		595.00		946.00	
Mean of ranks:	37.00		45.00		17.50		22.00	
Standard Deviation:	83.18		73.48		23.48		33.50	
U-value:	346.5		127.0		84.5		59.5	
Z-Score:	2.57		3.16		0.40		2.78	
p-value	.01		.002		.69		.005	
Critical Value	The result is significant at p < .05.		The result is significant at p < .05.		The result is not significant at p < .05		The result is significant at p < .05.	
r	.35		.47		.15		.81	
β	.54		.36		.11		.45	

In School A, Year One 22 children were identified as having a specific difficulty with reading and spelling. They had a mean pre-test syllable score of 7.77 which was 4.09 marks less than the remaining 51 children. The Mann-Whitney U-Test indicated this difference in mean scores was significant (U = 346.5, p = .01, r = .35). In School A, Year Three 9 children were identified as having a specific difficulty with reading and spelling. They had a mean pre-test syllable score of 21.22 which was 4.18 marks less than the remaining 80 children. The Mann-Whitney U-Test indicated this difference in mean scores was also significant (U = 127, p = .002, r = .47).

In School B, Year One 7 children were identified as having a specific difficulty with reading and spelling. They had a mean pre-test syllable score of 9.29 which was 1.23 marks less than the remaining 27 children. The Mann-Whitney U-Test indicated this difference in mean scores was not significant ($U = 84.5$, $p = .69$, $r = .15$). In School B, Year Two 9 children were identified as having a specific difficulty with reading and spelling. They had a mean pre-test syllable score of 12.89 which was 5.08 marks less than the remaining 34 children. The Mann-Whitney U-Test indicated this difference in mean scores was significant ($U = 59.5$, $p = .005$, $r = .81$).

Analysis and Discussion:

In all four year groups, the children who were identified as having a difficulty with reading and spelling scored lower in the pre-intervention syllable test than their year group peers. This was significant at $p < .05$ in each year group (with modest effect size, although Year Two School B had a strong effect size) apart from Year One, School B. It is uncertain why this might be. The analysis suggests that children who are identified as having a difficulty with reading and spelling might also find syllable segmentation harder than their peers. What is not certain, however, is whether the poor reading and spelling skills are a result of the syllabic difficulty or whether in fact the poor syllabic ability is one of many difficulties faced by a child who finds reading and spelling difficult. The next section endeavours to answer this by exploring the subsequent progress made in reading and spelling for the above children.

E.6.3 Syllables and reading/spelling difficulties

Two tables below show the progress made by children who were identified as having a difficulty with literacy and received the 25 week syllable intervention. For one of the tables (E.6.3.2) there is an additional column where the data for all children is combined. This is because a requirement of the Mann-Whitney U-Test is to have at least 5 sets of data which in some comparisons did not exist (School A, Year Three and School B, Years One and Two). Furthermore, whilst I presented the data from School B for transparency, it cannot

be used for comparison as the classes were already streamed by ability. Consequently, to give me a larger data set, I combined the progress from Years One and Three in School A. To get the most accurate analysis I matched the pre-test data for the children who were identified as having a difficulty with literacy and receiving the syllable intervention (*n = 12*) with children who were identified as having a difficulty with literacy but receiving the synthetic phonic intervention (*n = 12*). Table E.6.3.1 shows the average scores of both these groups:

Table E.6.3.1 Matched Scores for Children with Literacy Difficulties

		Salford Reading Age				SWST Spelling Age				Syllable Assessment		
	Age when starting 1st September 2016	Sept 16 Age	Reading age minus actual age	Reading Progress in Years	Progress in Years minus 9 months	Sep 16 Age	Spelling age minus actual age	Spelling progress in years	Progress in Years minus 9 months	Sept 16	Sept to Jun Progress	Total reading and spelling age above actual age
Syllable	6.12	5.30	-0.82	2.19	1.44	5.45	-0.67	1.38	0.63	9.23	19.58	-1.49
Synthetic	6.15	5.28	-0.87	2.03	1.28	5.49	-0.66	1.29	0.54	10.15	18.20	-1.53

When matching the classes I focused predominantly on ‘reading age minus actual age’ and ‘spelling age minus actual age’ as I wanted to create two groups who had similar assessed difficulties with reading and spelling. As the table shows, both the syllable group (*n = 12*) and synthetic phonic group (*n = 12*) had similar below age reading and spelling ages making them an appropriate match and this returns to the third point listed in the matching process by Johnson (2008) that researchers can rearrange the groups until a suitable match is formed.

Table E.6.3.2 shows the syllable progress of all children within each year group who were identified as having a difficulty with reading and spelling. Children who received the syllable intervention were then compared in syllable progress against those who received the synthetic phonic intervention. Table E.6.3.3 compares the syllable progress of the children identified as having a difficulty with literacy with the remaining children within their class, in other words it explores whether the identified children made progress above and beyond that of their peers over the 25 weeks.

Table E.6.3.2 Literacy Difficulty and Syllable Progress - Year Comparison

	Literacy Difficulty in School A				Literacy Difficulty in School B				Combined	
	Year One		Year Three		Year One		Year Two		Combined	
	Syllable Literacy Difficulty	Synth. Phonics Literacy Difficulty	Syllable Literacy Difficulty	Synth. Phonics Literacy Difficulty	Syllable Literacy Difficulty	Synth. Phonics Literacy Difficulty	Syllable Literacy Difficulty	Synth. Phonics Literacy Difficulty	Syllable Literacy Difficulty	Synth. Phonics Literacy Difficulty
n	11.00	11.00	7.00	2.00	4.00	3.00	7.00	2.00	12.00	12.00
Mean Syllable Progress	21.27	6.64	3.86	6.50	12.75	6.33	10.43	10.50	19.25	6.25
STDEV	6.15	4.20	5.84	6.36	2.75	2.52	4.79	2.12	8.52	4.22
STERR	1.85	1.27	2.21	4.50	1.38	1.45	1.81	1.50	2.46	1.22
Sum of ranks:	184.50	68.50							207.00	93.00
Mean of ranks:	16.77	6.23							17.25	7.75
U-value:	2.50	118.50							15.00	129.00
Sum of ranks:	253.00								300.00	
Mean of ranks:	11.50								12.50	
Standard Deviation:	15.23								17.32	
U-value:	2.5								15	
Z-Score:	3.78								3.26203	
p-value	.0002								.0011	
Critical value	The result is significant at p < . 05.								The result is significant at p < . 05	
r	.81								.69	
β	.95								.97	

Table E.6.3.3 Literacy Difficulty and Syllable Progress - Internal Comparison

	School A				School B			
	Year One Classes A1.1 and A1.3		Year Three Classes A3.1 A3.2 and A3.3		Year One Class B1.3		Year Two Class B2.3	
	Literacy Difficulty	Non-Literacy Difficulty	Literacy Difficulty	Non-Literacy Difficulty	Literacy Difficulty	Non-Literacy Difficulty	Literacy Difficulty	Non-Literacy Difficulty
n	11.00	25.00	7.00	46.00	4.00	2.00	7.00	7.00
Mean Post-test Syllable Progress Score	21.27	18.04	3.86	4.20	12.75	10.50	10.43	10.43
STDEV	6.15	5.42	5.84	4.04	2.75	2.12	4.79	5.38
STERR	1.85	1.08	2.21	0.60	1.38	1.50	1.81	2.03
Sum of ranks:	250.00	416.00	472.00	959.00			50.00	55.00
Mean of ranks:	22.73	16.64	23.60	29.06			7.14	7.86
U-value:	91.00	184.00	398.00	262.00			27.00	22.00
Sum of ranks:	666.00		1431.00				105.00	
Mean of ranks:	18.50		27.00				7.50	
Standard Deviation:	29.12		54.50				7.83	
U-value:	91		262				22	
Z-Score:	-1.58		1.24				-0.26	
p-value	.11		.21				.79	
Critical value	The result is not significant at p < .05.		The result is not significant at p < .05.				The result is not significant at p < .05.	
r	.27		.03				.0	
β	.49		.06				.06	

In Table E.6.3.2 the children in Year One identified as having a difficulty with literacy in both School A and B made more progress in syllabic awareness following the syllable intervention compared with those who did not receive the same intervention. This difference for School A, Year One and the combined data set was significant (U = 2.5, p = .0002, r = .81 and U = 15, p = .001, r = .69). Table E.6.3.3 shows that this progress made by the children with literacy difficulties is not significantly more than their peers who also received the intervention. Despite some difference in mean scores this was not significant in any of the comparisons (Year One, School A: U = 91, p = .11, r = .27, Year Three, School A: U = 262, p = .21, r = .03 and Year Two, School B: U = 22, p = .79, r = .0).

The next four tables share the respective reading and spelling progress of the children identified as having a literacy difficulty. Similar to the syllable tables above, they are broken down into two tables which look at whether the intervention made a difference by comparing children between different treatment types (Tables E.6.3.4 and E.6.3.6) and two tables which look at whether the progress made was greater within the same treatment (Tables E.6.3.5 and E.6.3.7):

Table E.6.3.4 Literacy Difficulty and Reading Progress - Year Comparison

	Literacy Difficulty in School A				Literacy Difficulty in School B				Combined	
	Year One		Year Three		Year One		Year Two		Combined	
	Syllable Literacy Difficulty	Synth. Phonics Literacy Difficulty	Syllable Literacy Difficulty	Synth. Phonics Literacy Difficulty	Syllable Literacy Difficulty	Synth. Phonics Literacy Difficulty	Syllable Literacy Difficulty	Synth. Phonics Literacy Difficulty	Syllable Literacy Difficulty	Synth. Phonics Literacy Difficulty
n	11.00	11.00	7.00	2.00	4.00	3.00	7.00	2.00	12.00	12.00
Mean Reading Progress in Years	2.36	2.07	2.48	3.27	0.83	1.19	2.74	2.58	2.49	2.27
STDEV	1.24	1.06	0.59	0.26	0.57	0.91	0.47	0.24	1.16	1.11
STERR	0.37	0.32	0.22	0.18	0.29	0.53	0.18	0.17	0.33	0.32
Sum of ranks:	136.50	116.50							160.50	139.50
Mean of ranks:	12.41	10.59							13.38	11.62
U-value:	50.50	70.50							61.50	82.50
Sum of ranks:	253.00								300.00	
Mean of ranks:	11.50								12.50	
Standard Deviation:	12.23								17.32	
U-value:	50.5								61.5	
Z-Score:	0.62								0.57735	
p-value	.54								.56	
Critical value	The result is not significant at p < . 05.								The result is not significant at p < . 05	
r	.12								.21	
β	.09								.08	

Table E.6.3.5 Literacy Difficulty and Reading Progress - Internal Comparison

	School A				School B			
	Year One Classes A1.1 and A1.3		Year Three Classes A3.1 A3.2 and A3.3		Year One Class B1.3		Year Two Class B2.3	
	Literacy Difficulty	Non-Literacy Difficulty	Literacy Difficulty	Non-Literacy Difficulty	Literacy Difficulty	Non-Literacy Difficulty	Literacy Difficulty	Non-Literacy Difficulty
n	11.00	25.00	7.00	46.00	4.00	2.00	7.00	7.00
Mean Post-test Reading Progress	2.36	1.61	2.48	1.14	0.83	0.63	2.74	3.10
STDEV	1.24	1.03	0.59	0.83	0.57	0.06	0.47	0.98
STERR	0.37	0.21	0.22	0.12	0.29	0.04	0.18	0.37
Sum of ranks:	254.00	412.00	319.50	1111.50			47.00	58.00
Mean of ranks:	23.09	16.48	45.64	24.16			6.71	8.29
U-value:	87.00	188.00	30.50	291.50			30.00	19.00
Sum of ranks:	666.00		1431.00				105.00	
Mean of ranks:	18.50		27.00				7.50	
Standard Deviation:	29.12		38.07				7.83	
U-value:	87		30.5				19	
Z-Score:	-1.71709		-3.41515				-0.63888	
p-value	.09		.0062				.52	
Critical value	The result is not significant at p < .05.		The result is significant at p < .05.				The result is not significant at p < .05.	
r	.31		.68				.23	
β	.36		.71				.13	

Table E.6.3.6 Literacy Difficulty and Spelling Progress - Year Comparison

	Literacy Difficulty in School A				Literacy Difficulty in School B				Combined	
	Year One		Year Three		Year One		Year Two		Combined	
	Syllable Literacy Difficulty	Synth. Phonics Literacy Difficulty	Syllable Literacy Difficulty	Synth. Phonics Literacy Difficulty	Syllable Literacy Difficulty	Synth. Phonics Literacy Difficulty	Syllable Literacy Difficulty	Synth. Phonics Literacy Difficulty	Syllable Literacy Difficulty	Synth. Phonics Literacy Difficulty
n	11.00	11.00	7.00	2.00	4.00	3.00	7.00	2.00	12.00	12.00
Mean Spelling Progress in Years	1.37	1.29	1.01	1.08	7.00	1.67	14.71	9.50	1.37	1.19
STDEV	0.63	0.72	0.76	0.59	4.55	4.16	7.76	0.71	0.69	0.67
STERR	0.19	0.22	0.29	0.42	2.27	2.40	2.93	0.50	0.20	0.19
Sum of ranks:	136.50	116.50							154.00	146.00
Mean of ranks:	12.41	10.59							12.83	12.17
U-value:	50.50	70.50							68.00	76.00
Sum of ranks:	253.00								300.00	
Mean of ranks:	11.50								12.50	
Standard Deviation:	12.23								17.32	
U-value:	50.5								68	
Z-Score:	0.62								0.20207	
p-value	.54								.84	
Critical value	The result is not significant at p < .05.								The result is not significant at p < .05	
r	.06								.13	
β	.08								.09	

Table E.6.3.7 Literacy Difficulty and Spelling Progress - Internal Comparison

	School A				School B			
	Year One Classes A1.1 and A1.3		Year Three Classes A3.1 A3.2 and A3.3		Year One Class B1.3		Year Two Class B2.3	
	Literacy Difficulty	Non-Literacy Difficulty	Literacy Difficulty	Non-Literacy Difficulty	Literacy Difficulty	Non-Literacy Difficulty	Literacy Difficulty	Non-Literacy Difficulty
n	11.00	25.00	7.00	46.00	4.00	2.00	7.00	7.00
Mean Post-test Spelling Progress	1.41	1.74	1.01	0.38	7.00	10.50	14.71	3.96
STDEV	0.63	0.88	0.76	1.28	4.55	13.44	7.76	5.12
STERR	0.19	0.18	0.29	0.19	2.27	9.50	2.93	1.94
Sum of ranks:	173.50	492.50	253.00	1178.00			73.00	32.00
Mean of ranks:	15.77	19.70	36.14	25.61			10.43	4.57
U-value:	167.50	107.50	97.00	225.00			4.00	45.00
Sum of ranks:	666.00		1431.00				105.00	
Mean of ranks:	18.50		27.00				7.50	
Standard Deviation:	29.12		38.07				7.83	
U-value:	107.5		97				4	
Z-Score:	1.01308.		-1.66817				2.55551	
p-value	.31		.09				.01	
Critical value	The result is not significant at p < .05.		The result is not significant at p < .05.				The result is significant at p < .05.	
r	0.21		0.29				0.63	
β	0.16		0.22				0.73	

Table E.6.3.4 shows how children in School A Year One and School B Year Two who were identified as having a difficulty with reading and spelling and followed the syllable intervention made more progress in their reading compared to children who found reading and spelling difficult but received the synthetic phonic treatment, although the reverse was true for A3 and B1.3. However no difference in mean progress was significant (U = 50.5, p = .54, r = .12 and U = 61.5, p = .56, r = .21). In E.6.3.5, all children apart from School B, Year Two who were identified as having a difficulty with reading and spelling made more progress in reading when compared with their peers in their year group. This result was significant for Year Three, School A (U = 30.5, p = .0062, r = .68) but not for Year One, School A (U = 87, p = .09, r = .31) or Year Two School B (U = 19, p = .52, r = .23).

The pattern for spelling as presented in E.6.3.6 was not dissimilar. Children in Year One in both schools and Year Two in School B made more progress in spelling after receiving the intervention. In School A Year Three the synthetic phonic group children made greater progress. This was not significant for Year One School A (U = 50.5, p = .54, r = .06) or when the data was combined (U = 68, p = .84, r = .13). When comparing the data within year groups, table E.6.3.7 shows that children identified as having a difficulty in Year One in both schools made less mean progress when compared with the rest of the class. Conversely, Year Three School A and Year Two School B made more progress then their peers. Again, this was not significant in School A Year One (U = 107.5, p = .31, r = .21) or Year Three (U = 97, p = .09, r = .29) but was signifiant for B.2.3 (U = 4, p = .01, r = .63).

Analysis and Discussion:

First and foremost, children in Year One in schools A and B who are identified as having a specific difficulty with reading and spelling and received the syllable intervention made more progress in syllable awareness than children who were equally identified as having a reading and spelling difficulty but followed the synthetic phonic treatment. This was significant for School A, Year One where the children who received the intervention (n = *11*) outperformed the children who did not receive the intervention (n = *11*) by 14.63 marks (table E.6.3.2). This was also significant when combining the data for all children across all year groups with those receiving the intervention (n = *12*) achieving, on average, 13 more marks than those who did not (n = *12*). This is, however, perhaps to be expected since they received the instruction it might therefore be expected that they would make greater progress. It is nevertheless relevant to this RQ insofar as syllabification is a skill which children can improve, and it is perhaps noteworthy that similar significant results are observable in RQ1. Of note also is the fact that Year One children in both schools who were identified as having a difficulty with syllables made greater progress in syllable awareness than their comparative year group peers (table E.6.3.3). Of course it cannot be ignored that they also started with a lower pre-test syllable awareness as already indicated in the first part of this RQ, therefore making it arguably easier to make greater progress.

The next step was to see whether improving syllable awareness for children who were identified as having a difficulty with literacy would have a causal relationship with reading

and spelling progress. Again, to achieve the most thorough understanding of this I compared the average progress both with children who did not receive the syllable treatment, as well as internally with children from the same treatment group. Progress, irrespective of direction was not statistically significant apart from Year Three School A (table E.6.3.5) where the children identified as having a difficulty with reading and spelling made more reading progress compared to their peers and School B, Year Two with respect to spelling (table E.6.3.7).

E.6.4 RQ 4 answer

Are there any differences between individuals or groups of children in their receptiveness to a syllable segmentation programme, according to their prior learning and any specific learning difficulty?

The answer to this final research question is twofold:

First, analysis of pre-test syllable data from all participants suggested that children identified as having a difficulty with reading and spelling might have an identifiable weakness with syllables. As presented in table E.6.2 in all year groups studied, children who were identified as finding literacy difficult had mean pre-test syllable scores which were lower than their year group peers. This difference was significant with moderate effect size for Years One and Three in School A and Year Two in School B. These findings potentially support the growing literature that there is a relationship between reading and spelling difficulties and syllabic impairment (Hulme and Snowling, 1997; Peterson and Pennington, 2012; Leong and Goswami, 2014; Mehta et al., 2018; Holliman et al, 2008). Nevertheless, further analysis between children identified as having a difficulty with syllables and their peers indicated that receiving the syllable intervention did not significantly improve their syllable awareness (table E.6.3.3) or literacy development (tables E.6.3.5 and E.6.3.7) when compared to the rest of the class.

Second, syllable progress was measured for the children who received the syllable intervention (table E.6.3.2) and analysis indicated that this was significant when compared with children who did not receive the syllable intervention in both School A Year One

(strong effect size) but also when the data was combined (moderate effect size). In seven out of ten comparisons (tables E.6.3.4 and E.6.3.6), the children who received the syllable intervention and identified as having a difficulty with reading and spelling made greater progress in reading and spelling than those children with a literacy difficulty receiving the synthetic phonics treatment. This progress was, however, not significant in any comparison and therefore no causal relationship could be established between the progress in syllable awareness with the progress in reading and spelling.

Consequently, to answer RQ4, the research was unable to prove any differences between individuals or groups of children in their receptiveness to a syllable segmentation programme, according to their prior learning and any specific learning difficulty.

(E) 7, Intervention conclusion

First written in February 2018, final edit January 2021.

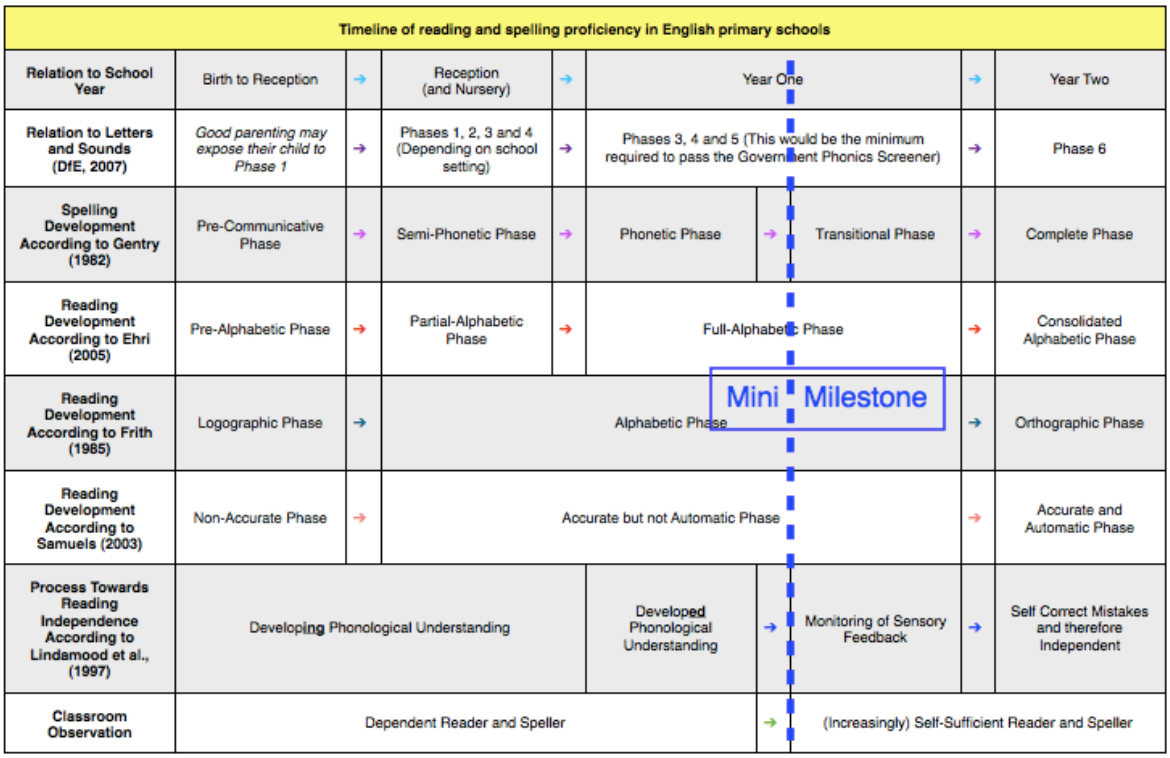
E.7.1 Teaching syllable segmentation

In 2017 I was invited to present at a conference [14] where the government's phonics advisor, Gordon Askew, argued that the difference between 'good' phonic provision and 'outstanding' phonic provision was that outstanding schools see synthetic phonics as 'the only' way to teach children to read and write. Furthermore, if children were not at the expected level, more concentrated and frequent synthetic phonics training was required. As a KS1 teacher in England, I too started my career using synthetic phonics as *the only* way to help children to read and spell and yet I was encountering children each year for whom reading and/or spelling was difficult and synthetic phonics alone was not working. Paradoxically, the government's synthetic phonics handbook, Letters and Sounds, (DFE, 2007:176), concludes its programme by stating that syllables are an appropriate tool to "provide a routine for spelling longer words." This paradox was the motivation to pursue this research and together with my initial MSc findings, formed my core RQ which sought to better understand the link, if any, between syllables and literacy development.

When discussing theories of reading and spelling development in my literature review, I plotted a table in which I mapped out how children progressed through the different phases. In doing so I integrated my own teaching experience and argued that there was a 'Mini-Milestone' in reading and spelling development. This 'Mini-Milestone' was the shift from being a 'dependent' reader and speller to becoming increasingly 'self-sufficient' which is presented again in figure E.7.1.1 below:

[14] Insider Government Conference, slides can be found in appendix H.9.

Figure E.7.1.1 Mini-Milestone in Literacy Development



I suggested that this ‘Mini-Milestone’ occurs, for spelling, during Gentry’s (1982) ‘Transitional Phase’ and, for reading, half way through Ehri’s (2005) ‘Full-Alphabetic Phase’. In both of these phases, the child is becoming more efficient at recalling correct sounds and letters. Whilst my literature review indicated that there were numerous studies which linked the predictive power of phoneme awareness with reading ability (Choi et al., 2017; Johnston et al., 2012; Engen and Høien, 2002; Hatcher et al., 2004), I found similar studies connecting the predictive power of syllable awareness and reading ability (Chetail and Mathey, 2008; Mehta et al., 2018; McBride et al., 2002; Bridges and Catts, 2011). Therefore, whilst synthetic phonics might help the majority of children to achieve this ‘Mini-Milestone’, my literature review on syllables was increasingly suggesting that syllable segmentation skills could also play an important role in helping children progress through the phases because of three main benefits to reading and spelling:

1. Syllable segmentation reduces the connections from print to memory which could help with storing and recalling words from memory (Bhattacharya and Ehri, 2004; Ehri 2005; Henry 1988). In short, having syllabic tools to tackle polysyllabic words is not only logical, it returns to the concept of a ‘Mini-Milestone’ in literacy development as the

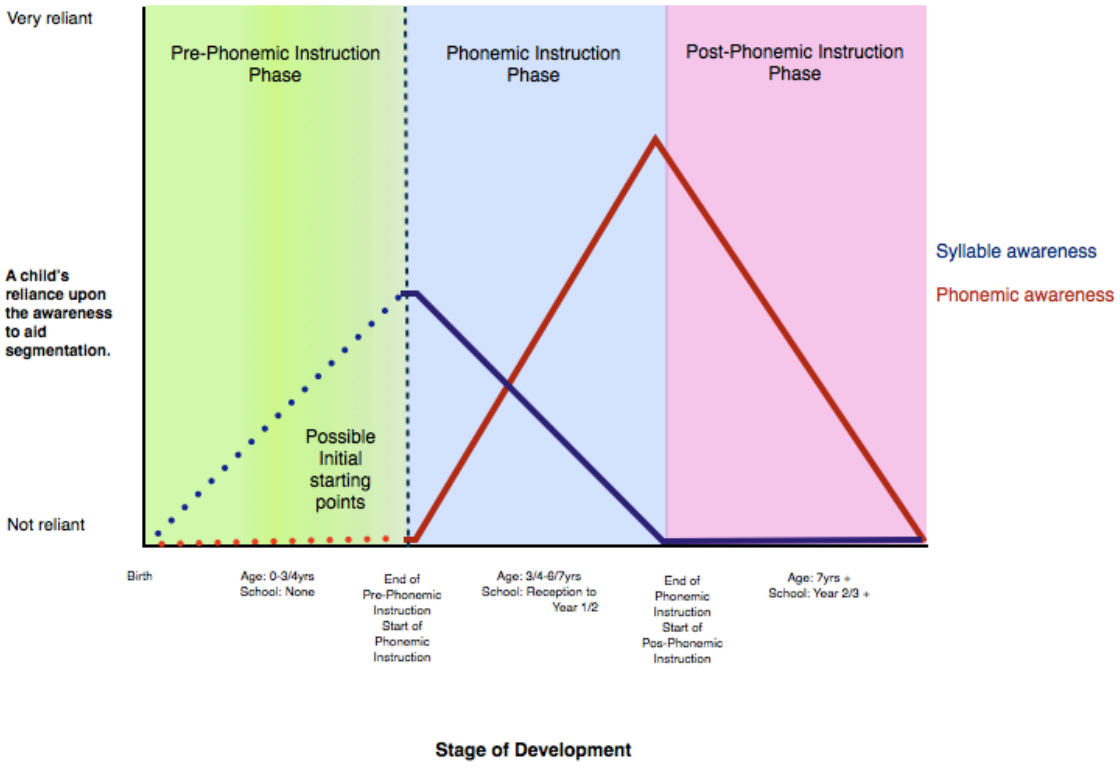
syllabic skills help the child to become a ‘self-sufficient’ learner because they increase the speed and accuracy with which words can be decoded and segmented.

2. Having a greater syllabic awareness might increase the use of onset and rime patterns to help reading and spelling. This is not only because onset and rime awareness occurs before phonemic awareness (Treiman, 2013), but also because learning syllabic structures can have a knock on effect to segmenting and blending similar syllables (Glazzard, 2017; Chetail and Mathey, 2008). Equally, learning syllabic patterns, such as learning prefixes and suffixes, can also help with reading and spelling (Berlinger and Wolf, 2009).

3. Linked with argument (2); the third reason why syllables are important to teach is that phonological development is hierarchical, with children moving from *syllable*, to *onset and rime* to *phoneme* awareness (Brady and Shankweiler, 2013; Treiman, 2013; Zieger and Goswami, 2005; Goswami, 2006). Therefore it is crucial syllable awareness is taught correctly from an early age to ensure remaining phonological development is not impaired. The literature suggested that syllable awareness begins as a ‘*natural*’ understanding and that pre-school children familiarise themselves with syllable structures as soon as they learn to speak and hear words (Leong and Goswami, 2014; Mehta et al., 2018; Hartas, 2006; Choi et al., 2017; Goswami, 2006; Chew, 1997).

The idea of syllables being a ‘natural’ way to read and spell and occurring ‘naturally’ during pre-school years ran almost contrary to my experience as a KS1 teacher where I saw little evidence of children having any syllable awareness. Whilst I understood the principles of phonological hierarchy, with prosodic awareness developing naturally, I questioned whether the dominance of synthetic phonics teaching skewed this development. To illustrate this thinking I presented Figure E.7.1.2 which visualised how I interpreted the reality of phonemic and syllabic awareness as a result of what children were exposed to in schools:

Figure E.7.1.2 Syllable and Phoneme Relationship - The Reality



The findings from my own analysis seemingly corroborated this argument that explicit syllable segmentation skills need to be taught. Pre-test scores showed that no child in Years One, Two or Three scored full marks in the syllable screener. In School A, Year One scored on average 29.6 per cent. In School B, Year One the average score was 23.5 per cent. For Year Two, School B this increased to 43.5 per cent and School A, Year Three scored the highest with 69.33 per cent. Whilst the scores from Year Three were significantly higher than Years One and Two they still represented an incomplete understanding.

This argument was further supported with RQ2 which sought to find out what children's views about learning syllable segmentation were. I identified only one mention of syllables in any of the pre-test interview transcripts (and this was from a child who I interviewed one week after he started the syllable intervention). Furthermore, through analysing the post-test interviews, I highlighted the fact that 'syllables' were not mentioned by any of the children who did not receive the syllable treatment. The only exception to this was Child 4.2 who said the following:

33	Child 4.2	Ye, [...] spelling ‘impossible’ and you, [...] like kind of, [...] like you spell it ‘imposs-i-ble’.	PN£ S1L -- S=G -- C0?

I found myself returning often to this transcript as despite receiving the synthetic phonic intervention, I felt it demonstrated a natural attempt at reducing the number of chunks needed to spell the word ‘impossible’. I also interpreted the transcript as an example of wanting to use ‘bigger chunks’ as an easier method to segment polysyllabic words syllabically. As a result, I concluded that it exemplifies why it is important to teach syllable segmentation skills because despite his attempt at breaking the word into syllables, it is incorrect; thereby highlighting the need for the teacher to correct his misconception.

At this point, it is worth briefly noting that, on average, every class who did not receive the syllable treatment still made progress in syllable awareness over the 25 weeks. Whilst the literature had alluded to the idea that syllable awareness is a skill which requires teacher input (Tarraran, 2018; Mesmer and Lake, 2020), the data I collected over the 25 weeks showed that syllable awareness can improve without instruction, supporting research from Choi and colleagues (2017). It must be stressed that this progress was very small but it showed that literacy development can contribute to syllabic awareness, consciously or subconsciously.

Colleagues and I did, however, reflect on these small increases as potentially attributable to a ‘Reactive Effect’ (Kumar, 2005) whereby the children not receiving the syllable intervention still made progress in the post-test syllable assessment because they had become used to the test itself and/or learnt from having already completed a similar test before. Furthermore, we also discussed ‘Experimental Treatment Diffusion’, whereby children and/or teachers from the syllable group were ‘contaminating’ the comparison group. Whilst colleagues and I concluded that it was unlikely that five to eight year old children were discussing the pros and cons of phonic segmentation strategies in the playground, we felt there was a genuine risk that this interest in improving phonic practice was having an effect on all staff. Consequently, regardless of which intervention treatment staff taught, the larger impact of improving the phonic provision may have filtered into day-to-day teaching.

Crucially, however, the syllable progress was greater for the children who followed the syllable treatment. After the 25 week intervention, the data from the post-test syllable screener suggested that children in Schools A and B who received the syllable intervention made greater progress in their syllable awareness compared with the classes who received the extra synthetic phonic instruction. Non-parametric data analysis showed that this progress was significant for A1.1, A1.3, A3.2, B1.3 and B2.3. Whilst A3.1 and A3.3 (in both comparisons) also made greater progress in syllable awareness than their matched classes (2.05, 2.04 and 0.69 more on average respectively), the progress was not significant which was also corroborated by the standard error for each mean. At this point, it is also important to stress that my own class in which I taught the syllable intervention (A1.1) made less syllable progress than the other Year One class following the syllable intervention. Whilst the person administering the intervention can play a large role in the effectiveness of an intervention (Dessemont et al., 2019), the fact that my class had not made the biggest progress suggested I was not overstating the success of the intervention (Suggate, 2014).

Adopting a mixed-methods approach helped me understand this syllabic progress better. After the post-test interviews were coded I was able to count and compare the number of times syllables were mentioned. For the children receiving the syllable treatment this increased from 2 to 20, but remained static for the synthetic phonic group. Whilst this was a very simple analysis, it did show that direct instruction made a noticeable difference to the awareness of syllables for those children in the syllable group.

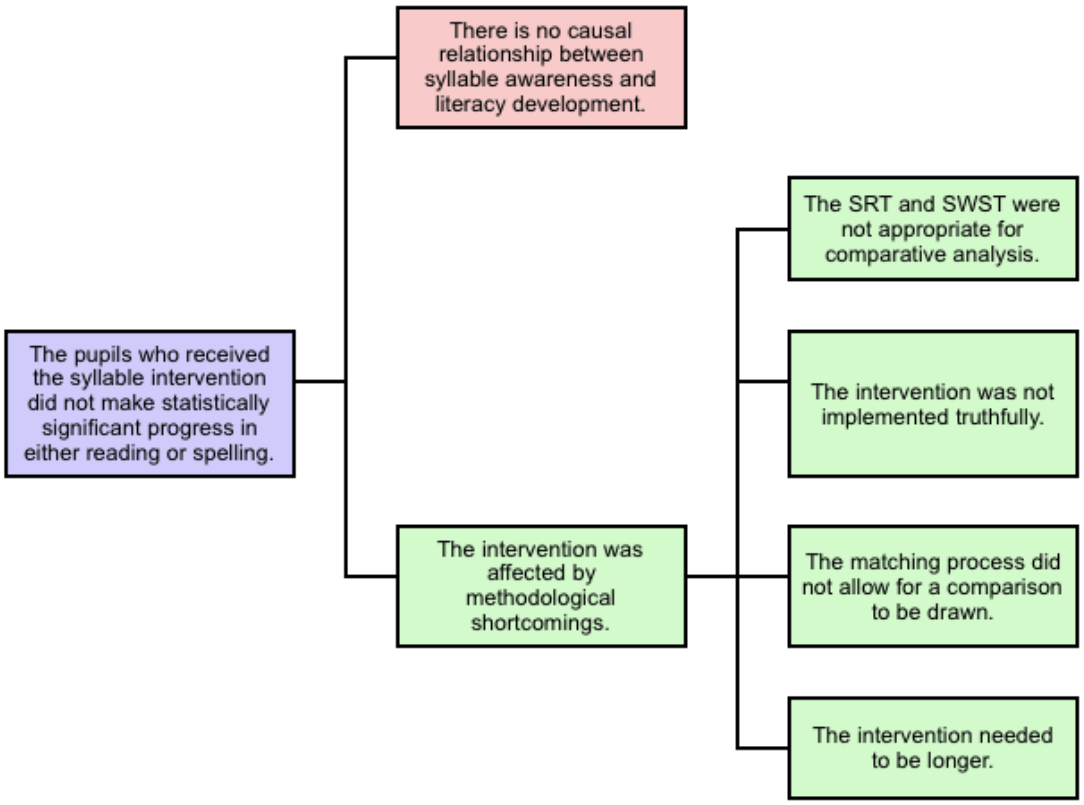
For RQ2 I built a deeper analysis as part of a case-study approach for six children who received the syllable treatment. This involved analysing the exam scripts for both the SWST, PM-Reading Benchmark Miscue Analysis and their creative writing as part of Big Write. Whilst the difference in SWST and PM-Reading scores were too small to analyse, the difference in polysyllabic words correctly attempted was noticeable for almost all six children. Furthermore, when I compared this overview of the six case study participants with the post-test interviews I could see that some children had learnt some of the key teaching strategies. Interview transcripts held examples of participants segmenting ‘transporter’ into its respective three syllables and children discussing the ‘robot arms’ of decoding words.

Consequently, I feel confident in stating that syllable awareness is a skill which could be improved and had improved as a result of the syllable intervention. My interviews with staff showed that teaching this intervention was, at times, difficult but also beneficial for their own CPD and it forced them to reflect more on their own understanding of how language works (Allott, 2019). The interviews showed similarities in staff mentioning new understandings and that it had made them reflect on phonics more generally by asking them to research a single aspect of it.

The next step was to analyse whether the relationship with reading and spelling. As Kenny (2019: 1019) notes, “To draw causal conclusions from any study requires a detailed inquiry.” My initial analysis from the post-test SRT and SWST data showed that the classes who received the syllable instruction had made greater mean progress with reading and spelling. In seven out of ten comparisons, the class who received the syllable intervention also progressed more with their reading. Similarly, in nine of ten comparisons, the class who received the syllable intervention also progressed more with their spelling. However, the Mann-Whitney U-Test indicated that this progress was only significant for two comparisons. The other 18 comparisons were not statistically significant. For each of the comparisons I presented error bars which clearly showed the overlapping standard error. Consequently, it was not possible to prove statistically that children who follow a syllable intervention programme progress more in their reading and spelling compared to a matched group who focus only on synthetic phonic skills.

The AR framework is clear that this conclusion drawn from the data should not be the end of my AR journey and I was motivated to reflect critically on the significance of these findings. Figure E.7.1.4 is an attempt at visualising this thinking:

Figure E.7.1.4 RQ1 Explanation



As the figure hopefully shows, one answer is that in Schools A and B there was no causal relationship between syllable awareness and literacy development. This was a very important starting point, perhaps even more so to ensure we were not allowing any potential bias to affect our interpretation of the data. Therefore, the SRT and SWST progress might just have been coincidental.

Alternatively, colleagues and I reflected on whether there were fundamental issues with the research design and methodology and whether these could have affected the research outcome. I must stress that this line of thinking was not an attempt to dismiss the conclusion drawn from the data and propagate a theory which cannot be sustained. Instead, we felt it was prudent to reflect critically on the research design to see where errors may have occurred so that future research carried out in Schools A and B might learn from them.

These reflections were broken into four key questions: First, were the SWST and SRT appropriate for comparative analysis? Second, were the intervention lessons implemented

truthfully across all of the different classes? Third, was the matching process adequate to subsequently measure progress accurately between comparison groups? Finally, would the intervention have benefited from increasing its length?

(4) Later in this thesis I discuss the concept of 'fidelity' from a pharmaceutical perspective, specifically its link with 'dosage' (Trickett et al., 2020). This idea resonated with me as I questioned whether the 'dose' of this syllable intervention had been long enough? After establishing no causal relationship in the matched reading and spelling progress, the question arose as to whether the syllable intervention could have had a greater effect on literacy development if the teaching had been extended. This could have been achieved by either increasing the time spent on each intervention lesson (for example changing it from 5 to 20 minutes) or extending the intervention period (for example instead of one academic year, perhaps broadening it to two academic years).

Whilst it is impossible to know whether this would have made a difference without further testing, it is worth noting that there were specific reasons as to why I felt this was impractical at the time of designing my research. First, each intervention lesson was five minutes long with three lessons each week because this was manageable for teachers and research backed (Allott, 2019; EEF, 2018). As outlined in subsection C.4.1, School B was specifically chosen for its similarity to School A with regard to timetable pressures and therefore I had to weigh-up increasing time dedicated to teaching the intervention with stakeholder and colleague buy-in. Regarding increasing the length of the intervention over two academic years, this would have made the design more complicated. Notwithstanding the inherent difficulty of what happens when staff move year groups and schools, I had incorporated a MBITSD and therefore this would have resulted in the second cycle finishing after four years. Ultimately, colleagues involved in the research agreed that extending the intervention in either way would have been impractical.

(3) Whilst I had endeavoured to achieve a good match for each class in Years One and Three in School A, this was by no means 'perfect' and therefore should to be taken into account (Johnson, 2008). Whilst I had specifically designed my research to 'preselect' participants to minimise the disruption to both the pupils and the teachers (Creswell, 2018; Johnson, 2008), we did consider upon reflection whether there would have been greater value in forming intervention groups with better matched data. This could have reduced some of the variance in ability levels seen within the classes. This is something I will

return to in section G when I reflect more holistically on the difficulties of carrying out experimental research in educational settings.

(2) Regarding fidelity, it was certainly possible that not all classes were carrying out the intervention truthfully. The risk to fidelity remained my greatest concern and my experiences, as will be noted in subsection F.3.3, brought to the fore just how stretching this ambitious AR project was. This was not just personally, with my own focus constantly split between my class and the others involved, but also the fact that it must have been difficult for all staff, as documented in E.3. Whilst I had put in place as much as I felt was possible to improve the fidelity of the intervention, I realise now in hindsight that there may have been too many participants and therefore whilst my initial hope was to include as many participants as possible to improve the rigour of the work, ironically, this may have produced the opposite effect. Whilst I did my best to visit other staff and interview them, this was never unannounced and therefore it is impossible to say with absolute certainty that every lesson was followed by every member of staff as written in the handbook.

(1) Finally, with regard to the testing instruments, there were increasing questions being raised by colleagues about the appropriateness of the SWST and SRT. Whilst they were highly successful standardised assessments generating scores which should be comparable, the differences being measured were, in hindsight, perhaps too small.

For example the difference in reading progress between A1.3 and A1.4 was 0.081 years, which represented just under one month's progress (one month equating to 0.083). Similar small differences can be seen with spelling, for example the comparison between A3.3 and A3.5 where the progress measured 0.01 (1/12 of a month). Further compounding this question of the suitability of the instruments is the data collected from RQ2 which, by adopting a 'case study' approach, showed that Child 1.1 and Child 3.1 potentially plateaued with their reading and spelling progress. In other words their scores were much higher than the year group mean in the pre-test but their post-test scores were not noticeably higher than their pre-test scores. A closer look at the data suggested that progress in the SWST and SRT might have been unfairly skewed towards lower ability children. These potential shortcoming might have been uncovered prior to the intervention beginning with more rigorous piloting and therefore regrettable that this was not done. When discussing this with colleagues, however, we did question whether even with piloting we would have deviated from the standardised assessments as they were the norm in

both schools across all year groups and it is therefore would have caused significant disruption to change them.

E.7.2 Syllables and literacy difficulty

The final part of this EdD was something which grew organically over the years, both in its personal importance and level of interest. Whilst my own dyslexia diagnosis and school experience made me interested in specific learning difficulties, the argument that improving syllable awareness could make a significant difference to the learning outcomes of certain individuals became a driving force behind my work. Therefore, the final RQ explored whether there were any differences between individuals or groups of children in their receptiveness to a syllable segmentation programme, according to their prior learning and any specific learning difficulty?

To answer this question I explored some of the key literature surrounding dyslexia. In particular, I focused on dyslexia's definition, its characteristics as well as the research which suggest dyslexic individuals have a unique difficulty with syllables. The literature indicated that this link with syllables can be further subdivided into two arguments. On the one hand scholars argue that for children who have poor recall, such as children who have a difficulty with reading and spelling (Marther and Wendling, 2012; Reid, 2009; Snowling and Stackhouse, 2001), their short-term memory can be overwhelmed in retrieving all the necessary phonemes to decode and segment words effectively (Ehri, 2005). Alternatively, a second argument which has grown over the years, is that there might be a specific syllabic difficulty faced by children who find reading and spelling difficult.

In short, for those who struggle with reading and spelling their phonological understanding may be impaired due to an incomplete syllabic understanding which occurs at the start of the phonological hierarchy (Brady and Shankweiler, 2013; Treiman, 2013; Zieger and Goswami, 2005; Goswami, 2003). Evidence for this began over twenty years ago with Hulme and Snowling (1997) who showed that dyslexic children performed less well on syllable awareness tests compared with chronological age matched controls, which has since been corroborated by Peterson and Pennington (2012) and Leong and Goswami (2014). Further research has identified that the difficulty stems from a reduced sensitivity

in detecting amplitude modulation in stressed and unstressed syllables (Mehta et al., 2018; Leong et al 2011; Holliman et al, 2008).

My own research supported the above findings by showing that children who were identified as having a difficulty with reading and spelling also had an innate weakness towards syllables. As presented in Table E.6.2, all children who were identified as having a difficulty with reading and spelling also had a mean pre-test syllable score which was lower than their year group peers. The Mann-Whitney U-Test indicated that this difference was significant for Years One and Three in School A and for Year Two in School B.

My research was, however, unable to prove conclusively whether this relationship was causative. This was because the subsequent progress in reading and spelling was not significant for the children studied, apart from reading in classes A3.3 and B2.3. In this respect, the data did not corroborate the research from Tarraran (2018) who noted that children who received a syllabic intervention significantly improved their reading compared to those who did not receive the intervention.

E.7.3 What happened next?

> "*Teacher research happens in the real and messy environments of schools. Generalisability is not terribly important; what matters is that the situation at the end of the research is demonstrably better than it was when the research started and that the path to improvement is itself a matter of improving.*"
>
> (Cain, 2019: 136)

In the summer of 2017, I met with stakeholders in School A and my contact in School B to discuss whether we would continue with the second cycle. This cycle would ensure that the children who had received the synthetic phonic intervention were not withheld the syllable teaching, simply delayed, and the decision was taken to continue, as planned, with this second cycle.

At this point (September, 2017) I had tentatively presented findings which showed that the mean reading and spelling progress was higher for the classes which had received the syllable intervention. I had not, at this point, finished the non-parametric analysis which would show that this progress was not significant. Crucially, however, the progress in reading and spelling played little part in the decision making of senior leaders in terms of whether we should continue or not. Instead, the first reason why it was decided to continue with the second cycle was because syllable awareness did improve for those children who received the intervention. Therefore from an ethical standpoint we wanted to ensure that the children who did not receive the intervention were at no teaching disadvantage, irrespective of whether it went on to have a causal relationship with literacy development or not.

Second, it was decided that even if my particular research was unable to show conclusively how syllable awareness contributes to reading and spelling development, it seemed reasonable to assume that it could only be beneficial for the children whose syllable awareness had improved, especially when Letters and Sounds suggested it as an appropriate tool for tackling polysyllabic words (DfE, 2007).

Finally, through my post-test interviews which I carried out for RQ3 I noted that the intervention had improved the practice for all teachers. This was by, (1) encouraging staff to reflect critically on what they were doing and why (transcript E.5.3.6) and, (2) supporting staff to construct knowledge (Ripamonti et al., 2015). Furthermore, staff were in agreement that there was inherent value in continuing with syllable teaching. This went beyond their own practice and rippled into the learning outcomes for children, for whom they noticed it had made a discernible impact.

For these reasons, cycle two began on the 1st September 2017. It was never intended that cycle two would form part of this thesis because it would not follow a comparable research design, nor would it require the same kind of personal investment from me to lead the research (therefore potentially having less interest from an AR perspective). Nevertheless, the inescapable interconnectedness of having two cycles, especially when referring to AR, warrants a brief summary. I explore this in the final pages of this intervention conclusion alongside the aims and outcomes of the second cycle, which were threefold:

First, as already explained, the intention was to ensure all children within a single cohort finished the two years at no academic disadvantage to each other. The data collected from the final syllable test from the second cycle in June 2018 showed that this had been achieved. The gap in syllable awareness had evened itself within comparison groups across cohorts. Where once differences in matched classes were significant, for example in June 2017 A1.3 vs A1.4 had a gap of 13.53 marks ($U = 11$, $p = .001$, $r = .79$) this was now reduced to just 3 marks in June 2018.

Second, the additional cycle allowed me to continue exploring whether there was any link between syllable awareness and academic progress. This was, however, difficult to substantiate statistically as the second cycle diverged from a quasi-experimental design. I was, however, able to observe the long term impact of the intervention fortuitously through a new role within School A. In 2018 I moved from my teaching post in KS1 to become an English specialist for Years 5-8. Children who received the intervention in Years One and Three in 2016/17 were now in Years Five and Seven. Teaching them allowed me to see them continue with the skills taught as part of the intervention material. Their spelling and reading toolkit uses syllable segmentation strategies in a way which did not exist in previous years (as reported to me by long standing members of the department). Specific examples of this are in the weekly spelling lessons where children continue to break polysyllabic words into syllable chunks, despite the fact that the programme used in Years 5-7 continues to encourage phonemic segmentation (we follow a RWI programme in which each spelling focus has a ‘dots-and-dashes’ activity).

The third and final reason for implementing a second cycle was that it ensured staff were continuing to reflect on their own practice on a day-to-day basis. By keeping a component of the intervention running in both schools, teachers were being consciously reminded, almost on a weekly basis, to reflect on their own teaching, albeit with a clear focus on phonics teaching and syllable awareness.

Consequently, I hope it is clear that the reasons for implementing the second cycle were not dependent on the reading and spelling impact it might have. Both I and the school stakeholders, felt there was enough impact to justify its implementation and I will return to ‘impact’ in the final section of the thesis.

Part F - Reflections on my AR

First written June 2016, final edit April 2021.

(F) 1, Introduction

> "*Teacher journals can similarly provide practitioner researchers the opportunity to maintain narrative accounts of their personal professional reflections on practice*."
>
> Mertler (2017: 138)

Section F is drawn from the most pertinent extracts from my research journal and reflects on the intervention as a whole. It is, for this reason, purposefully positioned after the findings have been discussed and concluded. This section is split into three subsections, each reflecting on a different aspect of carrying out the intervention: (1) the steps I took to prepare myself, (2) administering the intervention and finally, (3) analysing the data which I had collected.

Reflecting is the key principle underpinning the cyclical process of AR (Susman and Evered,1978; Hine and Lavery, 2014; Stringer, 2008; Morales, 2016; Leak and Schule, 2014) and I hope that these three subsections exemplify the transformative effect reflecting on one's practice can have, both personally as well as institutionally. Nevertheless, this section aims to do more than just reflect on a literacy based intervention. By critically examining the processes and outcomes of the intervention, this section will hopefully explore the realities of carrying out an experiment within an AR framework. It will examine the key decisions I had to make along the way and how I navigated through the various 'pinch points' I was confronted with [15].

It is keenly reported that teachers make more decisions on a daily basis than most other professionals (Dudley and Duffy, 2016) and whilst it would be impossible to comment on each of these, my hope is that section F truthfully portrays my experience of AR by offering the reader complete transparency. Consequently, section F returns to the opening and

[15] I introduce the term 'pinch points' in subsection A.2.4.

recurring concept of a ‘play within a play’ in which my intervention acted as a mirror to reflect back outwards to the underlying processes which underpin AR. These will then be summarised in section G when I conclude on what I have learnt as a result of taking part in this AR.

(F) 2, The AR process: pre-intervention

F.2.1 June 2016 - August 2016

My priority over the school summer holidays in 2016 was designing the material for the intervention. Research suggests that an appropriate intervention implemented early in a child's literacy development can result in significant progress (Bridges and Catts, 2011; Simmons et al., 2008; Denton et al., 2006; Torgesen, 2000). Consequently my aim was to create a meaningful, well planned programme and this would need to be ready for the start of the academic year in September. During those two months after passing the registration viva in June 2016, I focused on putting everything together in a single intervention handbook. As a KS1 teacher, I was influenced by the formatting of the Letters and Sounds (DfE, 2007) and the RWI handbook (Miskin, 2006) as these handbooks were comprehensive, easily accessible and functional. Before creating my own handbook I knew that it would play an important role in the success of implementing the intervention as I would need staff to refer back to it on a weekly, if not daily, basis.

Consequently, the handbook needed to meet several criteria which I set myself at the beginning. First and foremost, it needed to be manageable. It could not be too big in its size; I intended to print and ring-bind the handbook for each member of staff so that it would be something they could physically keep on their desk as both a reminder to teach the intervention material and as a quick reference guide. It also needed to be manageable in its layout. It was crucial that staff could quickly open a page and get all the key information without being bogged down in wordy paragraphs. If the handbook was too complex or demanding it could easily be dropped off the busy schedule of a teacher's week.

Second, I approached writing the handbook from the perspective that some teachers' understanding of phonics, especially syllables, was not extensive. This was particularly the case for Year Three in School A where teachers were not teaching daily phonic lessons. Whilst mindful of keeping it manageable, I knew that it would also need to contain enough guidance so that staff felt confident to carry out the tasks. In this regard, the handbook would require elements of 'coaching' because I was going to have to improve the subject knowledge of staff (Dudley, 2013). This embodies some of the core

aims of my collaborative AR in that the process would be empowering (Hine and Lavery, 2014, Lebak and Schule, 2014). It would also encourage those staff involved to reflect on their own practice by virtue of being involved (Mertler, 2017; Garcés et al., 2016), therefore ultimately rippling through the institution as a whole (Pain, 2012).

Finally, the handbook would play an important role with fidelity and contribute to the overall trustworthiness of the data I collected. Edison and colleagues (2020:128) write that, "fidelity refers to the degree to which a programme is delivered as intended," and I needed to be confident that teachers were carrying out the activities as I wanted them to. My data would have been significantly compromised if I had left the teaching material open ended. There was a need to be prescriptive in detailing the aim, method and outcome for each activity.

The first step was to work out how many weeks the intervention would last. Once I had accounted for assessment points and transitional/catchup weeks I was left with 25 weeks for the intervention. I agreed this with stakeholders and staff involved as it was important to include them in this decision so that they understood I had considered the impact it would have on their teaching and that it should be manageable (Phillips et al., 2008). Similarly, in discussions with colleagues it was agreed that to ensure the intervention remained manageable, it should be taught no more than three times a week, each time for five minutes.

The activities themselves needed to be carefully planned but I was encouraged by the research from Pullen and Justice (2003) that teachers can teach several skills simultaneously. Allott (2019) writes about successful literacy interventions in terms of being a skill which is 'best learned in regular short sessions' and the National Reading Panel (NICHHD) showed that systematic phonics can impact reading progress irrespective of whether it is delivered 1:1 or whole class. Therefore it was decided that the extra synthetic phonic and syllable material would be roughly five minutes in length and simple enough to be played/taught at the end of an existing phonic lesson. In Year Three, teachers no longer taught daily phonics, therefore the intervention material was taught at the beginning of English lessons as a 'starter'.

In addition to the above, other considerations which needed to be taken into account were that the weekly activities needed to be incremental in difficulty and build upon the week

before. As the dependent variable was reading and spelling, I needed to ensure that both the syllable and synthetic phonic material balanced both reading and spelling tasks. Joliffee (2019: 90) notes that:

> "*As soon as teaching phonics has begun, it is crucial to provide frequent opportunities for pupils to apply their phonic knowledge in reading and writing activities*."

This was something I was keen to adopt, especially in the second half of the spring term when the syllable group would be teaching specific syllabification rules on day one; I wanted to ensure the remaining lessons in the week focused on ways to implement this into reading and spelling activities. Finally, I was influenced by Catts and colleagues (2005) and Hatcher and colleagues (2004) who note that literacy interventions benefit from an oral language component. This was particularly pertinent considering the literature I had reviewed about the importance of syllabic awareness deriving from speech (Peterson and Pennington, 2012; Leong and Goswami, 2014; Mehta et al., 2018; Leong et al 2011; Holliman et al, 2008).

My teaching experience was predominantly within Early Years and Key Stage One. Consequently finding five minute synthetic phonic activities proved time consuming but not onerous. I had a wide range of experience using very good website based games and could refer back to Miskin's (2006) RWI handbook as well as the recommendations from Letters and Sounds (DfE, 2007). Conversely, finding syllable activities required considerably more research - not just in finding similar web-based interactive games which the teacher could play on an interactive whiteboard - but also in finding activities which would improve awareness of syllables. Most of all, I was surprised by how many online games and resources taught syllable segmentation incorrectly. It was clear from my research into syllable activities that the difficulty with syllables as outlined in the literature review (Duanmu, 2009; Bhattacharya and Ehri, 2004; Henderson, 1985), was mirrored in the education based activities I was finding online. I was guided throughout my research by syllabic rules which I had seen corroborated in the literature (Stone, 2012; Duanmu, 2009; Snowing and Stackhouse, 2001). In table F.2.1 below I list the nine rules which I used as a foundation to my teaching material, as well as my own personal reasoning as to why it is beneficial to learn the rule.

Table F.2.1 Syllable Rules and Benefits

Name	Rule	Benefit
Rule 1, Identifying a vowel-consonant-vowel	Identifying a **Vowel-Consonant-Vowel** (VCV) arrangement (and the exceptions...) - In a polysyllabic word where a consonant is sandwiched between two vowels the middle consonant often joins with the second vowel to form a syllable. - For example: Peter [pitə], Peter (VCV), Pe.ter (V.CV). - There are, however, exceptions to the V.CV arrangement. - When the middle consonant joins the second vowel it makes the first vowel become a long sound. Sometimes this would not fit and so the consonant needs to join the first vowel. - For example: petal [pɛt.æl]. a) pe.tal (V.CV) - This does not work as the first vowel would become long [pi.tæl]. b) pet.al (VC.V) - This does work and the first vowel would be short again [pɛt.æl].	The benefit of knowing these three rules when learning to spell might be that: - Children are far more likely to use the correct vowel phoneme when spelling words if they focus on the relationship the vowel has with the consonant. - Two of the most common errors I see when children spell is either omitting vowels or using an incorrect digraph for the vowel phoneme. For example spelling Peter [ˈpiːtə] as Pter or Piter. - By segmenting Peter into two syllables (Pe.ter) the child is able to listen to the 't' consonant and notice that the vowel before it is long. Not only does this chunking increase the chances of each phoneme being written, it can also improve with vowel choice because hearing the long vowel sound reminds the child that it does not require a vowel digraph such as 'ee' or 'ea' but instead the syllable break will create the long 'e' sound all by itself.
Rule 2, Identifying a double vowel	Identifying a **Double Vowel** arrangement - Double vowels should be treated as a single vowel sound and be segmented in a similar way to open and closed syllables. - For example: freedom [friːdəm], freedom (~~CVVC~~ = CVC), the ee makes a long sound and therefore the V.CV is adopted, free.dom (CV.CVCC).	
Rule 3, Identifying a split digraph	Identifying a **Split Digraph** arrangement - Similar to double vowel arrangements, the silent 'e' at the end of a split digraph should be treated as a single vowel sound. - For example: extremely [ɪkstrimlɪ], extremely (CvC = split digraph), ex.treme.ly (VC.CVC.ly).	
Rule 5, Identifying the 'r' digraph	Identifying the **r digraph** - Syllables where the grapheme r joins with a vowel should be treated as a single vowel sound. - For example: farming [fɑmɪŋ], farming (~~C~~VC~~C~~ = CVC), farm.ing (CVC.VCC).	The benefit of knowing this rule when learning to read and spell might be that: - Children are far more likely to remember the consonant 'r' in the vowel-r combination if they learn this as an explicit rule. For example, a common spelling error for young children is spelling farming [fɑmɪŋ] as faming. - Knowing that a syllable breaks after a vowel+r combination also helps an individual chunk a word when reading. Focusing on reading everything before the 'r' and everything after the 'r' can make blending easier.
Rule 6, Identifying the double consonant	Identifying a **Double Consonant** arrangement - It is not uncommon to find words in the English language with double consonants. - These are simple to separate into syllables as the break occurs between the two consonants. - For example: rabbit [ræbbɪt], rabbit (CC = Double C), rab.bit (CVC.CVC).	The benefit of knowing this rule when learning to read and spell might be that: - Children are far more likely to remember both of the consonants if they split the consonants in the middle. This idea runs in direct contrast to the advice given in synthetic phonic scheme handbooks. - Common spelling errors are rabit, mufin, sumer. Spelling the word syllabically would reduce these errors. - With regard to reading, spotting double consonants will encourage children to read the section before and including the first consonant and then chunk it with the section after and including the second consonant. This makes reading pollysyllabic words much easier.
Rule 7, Identifying the consonant blend	Identifying a **Consonant Blend** arrangement - A consonant blend is when two (or more) consonants are next to each other without a vowel separating them. - When a word has a VCCV pattern (CC = C Blend) the blend usually joins the second vowel and forms the second syllable. - For example: construct [kɒnstrʌkt], construct (CCC = CBlend), con.struct (CVC.CBlendVC).	

Rule 8, Identifying the compound word	Identifying **Compound Word** arrangements - Perhaps the easiest way to break certain words into their respective syllable chunks is to see whether the polysyllabic word is formed of two compound words. - If this is the case simply break between the two words. - For example; swordfish, sword and fish, sword.fish	The benefit of knowing this rule when learning to read and spell might be that: - Children are far more likely to be able to read or spell a word if they can easily break the word down into two, or even three, smaller words which they already know how to spell/ read. Focusing on each sound individually can over complicate something which would otherwise be far more simple. - I have often seen children panic at the prospect of reading or spelling stingray, swordfish or cannonball but laugh once they spot each word within it.
Rule 4, Identifying the (-le)	Identifying the **(-le)** arrangement (and the exception...) - If a word has an -le at the end, join it with the letter before to form a syllable. - For example: purple [pɜpəl], purple (-le), pur.ple (CVC.C+le).	The benefit of knowing this rule when learning to read and spell might be that: - Children are far more likely to remember the 'e' in the suffix 'le' if they learn this as an explicit rule. - Another common spelling error for young children is spelling purple [pɜpəl] as purpl or purpel. Learning suffix rules would reduce these errors. - This is a rule which also lends itself to reading as spotting suffix patterns can speed up blending words when chunking them. - This applies to many other common prefix and syllable chunks.
Rule 9, Identifying prefixes, suffixes and other endings	Identifying **Prefixes**, **Suffixes** and other **Endings** - Most prefixes, suffixes and other endings form their own syllable. - For example the prefixes; un-, re-, dis- are all syllables. - For example the suffixes; -ful, -ly, -ness, -est are all syllables. - For example the endings; -es, -ted, -ing, -ded are all syllables.	

This table guided my intervention material. In a similar account of AR, Lebak and Schule (2014: 12) write that:

> *"The first step in Lauren's [Schule] journey was recognising the need to change practice by focusing upon student learning as opposed to teaching."*

Table F.2.1 helped me achieve similar aims to that of Lebak and Schule by flipping the focus away from what I 'needed to teach' to what I wanted the students 'to learn' with a close eye on the impact it might have. In this respect I was questioning the 'content' of the intervention so that children might approach decoding tasks differently (Counsell, 2020). I was, however, aware that by having a table which matched syllable rules with perceived benefits I was already assuming a positive relationship. Whilst AR accepts these vested interests (Hine and Lavery, 2014; Anderson, 2007; Griffiths, 1998), it does reinforce the concern raised by post-positivists that researchers are constantly at risk of influencing their work due to their preexisting beliefs (Reichardt and Rallis, 1994). Consequently, I needed to be mindful that I was exploring this area with a degree of bias and so the most important consideration was ensuring I approached the synthetic phonic material with the same systematic structured approach which required having a similar table for synthetic phonics as the one above for syllables.

The programme was a 25 week intervention with 6 activities per week (3 syllable and 3 phoneme based). Therefore I needed to plan 150 activities in total. I also divided the handbook into three: I began by exploring syllables and phonemes orally through spoken games, songs and books. The middle section comprised syllabic and phonemic rules which needed to be taught and learnt. This was placed in the middle with the understanding that an initial awareness needed to be built first. The final section explored implementing these rules in syllabic and phonemic tasks. This hierarchical structure was intentional and in line with the literature (Brady and Shankweiler, 2013; Treiman, 2013; Zieger and Goswami, 2005; Goswami, 2006; Mehler et al., 1981). I was interested in which of the three sections might help children the most with their syllable awareness, if at all. Consequently, this motivation encouraged me to administer an additional two syllable screeners after the first and second stage of the intervention material to see if I could analyse any patterns.

In total the handbook took a full month to write. The handbook would not only act as a programme for all the teachers involved in the intervention, but would also give everyone involved a timeline and a structure to complete the year. Finally, aesthetically speaking, I wanted the handbook to look professional. I wanted anyone who picked it up to know they had something which had been well thought through and clearly designed. I wanted the handbook to feel as if it had inherent value so that, in turn, the teachers taking part in the intervention might feel they were undertaking something valuable [16]. Before the start of term I had the handbook proof read by colleagues, including my critical friend, for coherence and ensuring it met the criteria I had set myself at the beginning. This was an important aspect of my critical friendship as *Colleague R* gave me some good feedback from a practical perspective (McAteer, 2013; McNiff, 2013). Once happy, I had the document printed and ring-bound ready for the start of the year.

F.2.2 August 2016 - September 2016

Parallel to designing the handbook, I also needed to create the syllable tests. This needed to be a rubric from which I could construct two more tests which would enable me to track syllable awareness throughout the year. Subsection C.6 explains in detail the process in

[16] Please see appendix H.4 for the entire handbook, both cycle one and cycle two.

reaching this final test as well as presenting the KR-21 reliability data. Whilst the ground work for this had been done before the summer break I still needed to design, format and print the test booklets. As the new term approached, I felt apprehensive; I was constantly trying to reconcile my need to start the intervention on the first day of term with the desire to make it 'perfect'. In the first few days of INSET I shared all the material with staff. I was reminded of Coulson-Thomas (1997: 175) who wrote that:

> "[…] *unless vision, values, goals and objectives are communicated and shared, their impact if any is likely to be limited to those who formulate them*."

With that in mind I also shared the same presentation with my contact in School B who delivered the same material to her staff during their September INSET. I would have preferred leading the presentation in person in School B, but my contact suggested that her staff would accept the request more if it came from her. This highlighted the underlying principles of AR that it should fundamentally remain a piece of 'insider' research (Cain, 2019; Anderson et al., 2007) and as someone who was not familiar to School B I was very much an 'outsider'. This will remain a recurring theme in my work with School B and even other classes in School A; because I was not directly implementing the intervention in those classes, I could be considered an 'outsider', but the research was still being carried out by those 'inside' their setting.

(F) 3, The AR process: during-intervention

F.3.1 September 2016 - October 2016

My intervention timetable began on Thursday 1st September 2016. The first two weeks of the intervention were scheduled for data collection. This was intentionally built into the schedule to allow each member of staff the time to collect the data imperative for subsequent analysis, but also served an additional purpose of enabling me to ease staff into what they needed to teach. This was one of the many decisions along the EdD which created a 'pinch point' between academic research (encouraging longer intervention teaching time) with the reality of school environments and the already high pressure teachers work under. Consequently, in those first two weeks we took the decision to ease staff in and every member of staff used the SRT and SWST to establish a baseline assessment score. In those two weeks, I also used the pre-test data to match classes and assign teachers to different parts of the intervention. This decision to build a two week assessment buffer was repeated for each term. As a result, this shortened the teaching time for the intervention in one academic year from a possible 31 weeks to 25 weeks but it was a decision which in hindsight I would repeat as despite the small gesture, it resulted in good teacher 'buy-in' by recognising the pressure staff were already under.

Due to differing term dates, School B was ahead of School A by one week. As a result, my contact in School B was the first to ask whether the syllable test I designed had an answer sheet? Whilst the answer was initially 'no', and a relatively simple fix (it simply required me to make one), it perfectly highlighted the bias I carried into this intervention. Upon reflection it had not occurred to me to make an answer sheet as I had subconsciously assumed the answers were self-evident. Nevertheless, as soon as my contact in School B asked for it I made it and sent it to all staff. In hindsight, the answer sheet had value in not just providing the answers, it also enabled staff to quickly tick the correct option which sped up their marking.

The reason why my contact in School B wanted an answer sheet was because she was confused about three options I had given for the animal 'koala'. She did not know which was correct and when I looked at it I realised that I had made a typing mistake. For School A the solution was simple; no one had administered the test as we were a week behind so

it was easy to correct it and ask all the teachers to administer the new test. For School B the answer was less clear. We agreed, in the end, to remove the question on the koala. This is in line with similar pieces of research where single errors were found after the test had been administered (Norris and Cutler, 1988). I found the experience of having an error pointed out to me difficult and I was reminded of Claxton (2015: 117) who notes that,

> "[…] *staff may have well-established expectations that it is your competence and firm grasp that earns you your position.*"

I was asking other people to follow my guidelines and to have trust in what I wanted them to do, and so I felt that any errors would undermine this. Ultimately, these mistakes are part of AR, and this is exactly why the literature argues working with others on an AR project improves the rigour of the work (Morales, 2016; Holter and Frabutt, 2012; Clauset, et al., 2008; Anderson, 2007) which in this case it did by School B pointing out an error before School A administered it.

After collecting the data I was able to match the classes in School A. I looked at the scores from the syllable screener, and the reading and spelling ages assessed by the SRT and SWST to find two classes which were most comparable for each year group (the matching process is discussed in section E.2). The two most comparable classes would then either follow the syllable intervention or the synthetic phonic material. Irrespective of which group the class fell into, they retained the same core aspect of their lesson; the intervention would simply form an additional five minutes either at the end or beginning. Furthermore, the intervention for both groups would be 'new' to mitigate the 'Hawthorne Effect' (Snowling, 2001).

Nevertheless, the task of matching classes was not as simple as I had initially thought (as discussed in subsection D.1.3). School B did not require matched pre-test scoring and random allocation. Instead, the children were pre-assigned by the teacher to a specific group. In School B, both Year One and Year Two were three form entry. Their weekly phonics lessons were streamed by ability into sets comprising top, middle and bottom. For this intervention, in each year the top two classes were allocated to the synthetic phonic component of the intervention. The bottom set was allocated to the syllable intervention. This bottom set comprised children who, for various reasons, found phonics difficult.

Bell and Harrison (1998) argue that leadership needs to be 'decisive'. The decision to allocate the intervention and not adhere to the same structure as School A was one of the many moments in my EdD where I had to be decisive. Whilst in hindsight, it was an easy decision to make, at the time I was uncomfortable that School B was not doing the same as School A. One of my RQs was whether children who find reading and spelling difficult would benefit from syllable segmentation. Consequently, I needed to ensure that those children in the bottom group in School B received the syllable intervention.

Following the 'koala' issue, the next major hurdle I had to overcome was when I spoke to the Head of Year Three in School A and she explained that her team would now be unable to do the intervention this year, because, for reasons outside the school's control, four of the five teachers in the year were new. Like many large, high achieving schools, the pace of school life was already so quick that she felt implementing an intervention would be a 'bridge too far'. I realised I had to convince her that the intervention was going to be manageable for her and for her team. I also had to persuade her of the intrinsic benefit of researching this area of literacy development, something which the Head of Year had previously agreed was advantageous to explore.

I completely understood her concern regarding the added demand on time (Cain, 2019; Hine and Lavery, 2014). I, did, however try and counter this by sharing the benefits of how it could support the professional development of the teachers involved (Garcés et al., 2016). Whilst they were new to the school, the teachers were all experienced practitioners and I felt this was well within their capability. Finally, I was also transparent; the data from Year Three was important and it was a crucial part of my research design. After many meetings we agreed to start, albeit three weeks late, and that I would make PowerPoint presentations for every syllable lesson, so that the teachers could simply open it up and teach it.

This was the reality of AR in school. Despite the best of intentions, school life was unpredictable. I had agreed the quasi-experimental design with stakeholders and teachers at the end of summer 2016 but there was no predicting what the new academic year would bring. The silver lining to all of this were the PowerPoint presentations which the Head of Year requested. Once I had made these, I shared them with all the staff involved, both Years One and Three in School A and Years One and Two in School B [17]. I have no doubt

[17] Please see appendix H.6 for all the PowerPoint presentations.

that this improved the intervention and the ability for teachers to teach the syllable rules, as well as ensuring greater consistency in teaching throughout all classes teaching the syllable material. This was not something I had considered before the intervention but now seems obvious in hindsight.

F.3.2 October 2016 - May 2017

This subsection covers carrying out the intervention over the remaining three academic terms. My overarching concern throughout the 25 weeks was that of fidelity. I was mindful of the biases and vested interests which I and colleagues carried into the research and therefore the potential this could have to negatively affect the research (Waters-Adams, 2006). Edison and colleagues (2020) notes that,

> *"The emphasis on participation places the relationships among collaborative partners front and centre as critical to the processes and outcomes of the interventions. [This places] distinctive issues for fidelity […] for example participatory research stresses such structural issues as how decision making power is distributed among partners."*

Consequently my overriding aim throughout the 25 weeks of teaching was that all activities were being administered as planned by all teachers and that the research had good fidelity. In addition to these concerns, it was inescapable that my relatively junior position in the school - I was not a member of the Senior Leadership or Senior Management Team - might affect the way in which others responded to my requests (Mertens, 2005).

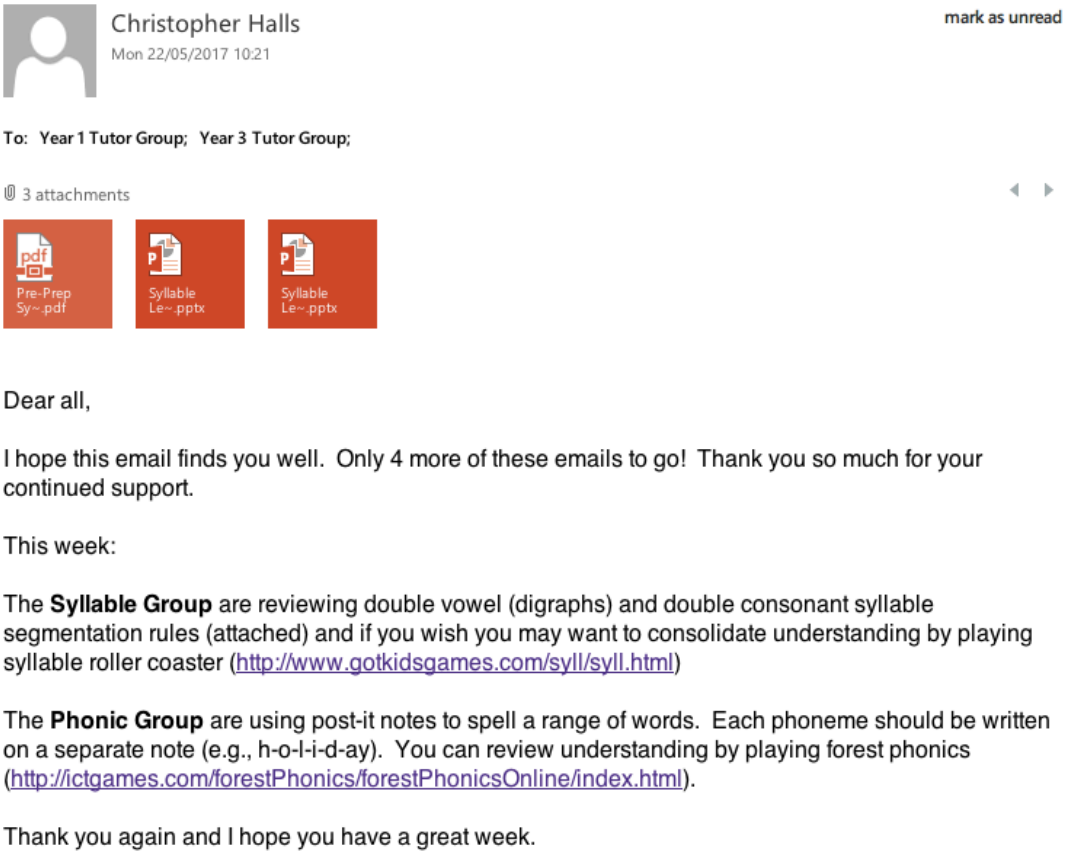
The 'experimenter effect' argues that the success, or otherwise, of an intervention can be dependent on the person who administers it; which links with process validity (Anderson et al., 2007). Interpersonal validity and treatment fidelity are also grouped closely with the 'experimenter effect' in that the person administering the intervention can affect the outcome of the data, both positively and negatively, through the extent to which the administrator follows the intervention material as planned (Mertens, 2005; Edison et al., 2020). It is for these collective reasons that I: (1) invested so much time in creating the intervention handbook (as outlined in F.1.1) but also, (2) created a strict plan for myself to

keep colleagues' morale high and motivated throughout the 25 weeks of teaching - which I explain further below.

From reading similar accounts of AR projects (Lebak and Schule, 2014) I understood that communication and transparency would be key as well as having a positive disposition. Writing about educational leadership, Bell and Harrison (1998) argue for the importance of being 'optimistic' that all teachers will embrace 'change' and to achieve this required improving my own management skills, especially the ability to motivate others.

One of the tangible ways I did this was through weekly emails. I planned the emails in advance so that no matter what came in on my desk on a Monday morning, I always had the email ready to send. The emails followed an identical structure each week and were sent to all staff involved, copying my contact in School B so that she could also forward this onto her team. With regard to the format of the emails, I always attached: a PDF of the handbook (despite staff having a physical copy), the PowerPoint for the rule being taught (both for the syllable group as well as the synthetic phonics group) and within the body of the email I summarised the key aims for that week. Figure F.3.2 below is an example from the 22nd May 2017.

Figure F.3.2 Email Example



Christopher Halls
Mon 22/05/2017 10:21

mark as unread

To: Year 1 Tutor Group; Year 3 Tutor Group;

3 attachments

Pre-Prep Sy~.pdf

Syllable Le~.pptx

Syllable Le~.pptx

Dear all,

I hope this email finds you well. Only 4 more of these emails to go! Thank you so much for your continued support.

This week:

The **Syllable Group** are reviewing double vowel (digraphs) and double consonant syllable segmentation rules (attached) and if you wish you may want to consolidate understanding by playing syllable roller coaster (http://www.gotkidsgames.com/syll/syll.html)

The **Phonic Group** are using post-it notes to spell a range of words. Each phoneme should be written on a separate note (e.g., h-o-l-i-d-ay). You can review understanding by playing forest phonics (http://ictgames.com/forestPhonics/forestPhonicsOnline/index.html).

Thank you again and I hope you have a great week.

These weekly emails had two principal objectives which tied in with my overarching aim to ensure good fidelity. First, it was a conscious effort to reduce any reason why staff might not be able to complete the intervention for that week. By simplifying the task I hoped that it was more likely to be implemented. Second, by sharing what the 'other side' of the intervention were doing simultaneously, I hoped that there would, again, be a greater intrinsic desire to complete the intervention as they did not want to 'let the team down'. Furthermore, this would also add value to what they were doing, especially for those teaching the synthetic phonic component who perhaps felt they were missing out by not teaching the syllable intervention.

In addition to the emails, I also went into classes periodically for a few minutes to observe the intervention being taught. This also involved working with teachers in School B. In their phonics research, Denton and colleagues (2006: 452) discuss how they ensured high levels of implementation quality and fidelity through the use of well timed and frequent observations. I used this as a guide for my intervention and along with other colleagues

who had received phonics training, we observed staff implementing the intervention. This was an important part of ensuring the material was being taught consistently across the schools but also a way of informally observing how easy it was for teachers to teach the material and how the children responded. I also used these opportunities to have valuable informal discussions with staff and children (Hubbard and Power, 2003) which helped me keep an overall understanding of how the intervention was going.

To the best of my knowledge, the teachers for all the cohorts followed the 25 week intervention timetable and adhered to the activities set out in the intervention handbook. This was, of course, difficult to measure conclusively which returns to the work of Edison (2020:137) and colleagues who call for the 'expansion' of the term 'fidelity' to account for the participatory relationship of the research.

The final point worth noting was that some of the syllable games did not always segment words in the correct place, despite my effort to check this before choosing the activity (this is when the syllable breaks in the games were compared with the table I had created using Stone (2012), Duanmu (2009) and Snowing and Stackhouse (2001). This was not an issue in the early months as the emphasis was on how many syllables a word had, but I had to tweak the handbook whenever I found a game which was incorrect.

F.3.3 May 2017 - June 2017

As briefly mentioned above, I had specifically built assessment weeks into the intervention. I had anticipated that not accounting for weeks where assessments would eat into the timetable would create unnecessary pressure on staff. The SRT and SWST were administered as part of the normal school assessment. I timed the Syllable Screener I had designed at the same time to ensure no further disruption was caused. Regarding interviews, I identified case study children at the beginning of the intervention by choosing a top, middle and bottom child from each Year One class in School A. This was done by randomly selecting one child from within each of these groups. I then interviewed them as well as a random selection of staff. These staff were also interviewed throughout the year. I also noted down informal conversations with colleagues throughout the year. Data for

syllable awareness was collected at two midway stages. This was with an interest in whether specific aspects of the intervention would have greater impact.

The final hurdle to overcome came when collecting the post-test data. When I spoke with the Head of Year Three regarding the post-test assessments, she apologised and informed me that her team were so busy they would be unable to do it. After several intense meetings, we agreed upon a compromise. She was willing to ask her team to do the SWST and the Syllable Screener but was uncompromising in helping me finish the SRT. This was a compromise in that the team had to do the SWST as it was part of school end of year assessment, and the Syllable Screener was not arduous to administer. The SRT required staff to read with individual children 1:1 and the Head of Year felt this was not currently feasible.

It was a unique situation to be in. The Headmaster and the Head of Section were unequivocally supportive of my research, so I could have arranged a meeting with them and asked them to ensure Year Three complied and completed this assessment. However, I felt that going over her head to make the team do it would not end well and was contrary to the aims of collaborative AR. I still needed their cooperation in the final few weeks of the intervention, as well as with the syllable data, and so I administered the SRT to all 100 boys in Year Three myself. I did this during any free time available and whilst not ideal, it did give me a unique opportunity to ensure consistency in the collecting of data.

In those final three weeks of term my teaching assistant was unfortunately taken ill. So, I found myself teaching my own class on my own, and using every free moment to assess Year Three. Simultaneously I had to make sure I was still leading my Year One team, ensuring that they were all doing the final post-test assessments whilst also conducting interviews with the Year One interviewees. On top of that, my mother was undergoing chemotherapy and I was also trying to organise a week's summer residential.

The reason for separating May-June (F.3.3) from October-May (F.3.2) is that these final two months truly highlighted the issues of embarking on such an ambitious AR project. Whilst Stibbard and colleagues (2020: 21) rightly point out that, "In any research study, there are limitations and challenges to be addressed," the scale of the challenge and number of 'pinch points' highlighted the fact that by over-stretching myself I was beginning to bring the overall quality of the research into question.

Upon reflection, having now finished the intervention study, the most important aspect which has since become clear is that the sheer scale of my work made it comparatively difficult for me to really reflect on the intervention at a micro-level; how was I carrying out the work in my class? By looking back on the year it is clear that consciously, or subconsciously, my focus throughout the 25 weeks leaned towards the macro-level; ensuring all staff were completing the intervention as intended and that it was, therefore, running smoothly. Nevertheless, F.3.4 below endeavours to summarise a few key reflections from my own experience of carrying out the intervention.

F.3.4 Intervention reflection

Timings:

- I was adamant that to improve fidelity the activities should only take five minutes, which on the whole they did. However, it was inescapable that some activities took longer because either the children enjoyed it (for example the BBC Syllable Factory was a big hit with my Year One class) or because they wanted to complete the next level (for example the Bear Chop). This is not necessarily a drawback but certainly a consideration when factoring how much time is required.
- I was surprised by the knock on effect the '5 minute intervention' had on my overall planning. As a KS1 teacher I had over the years choreographed my daily phonic lesson to strict timings. Consequently, 'carving' out an extra five minutes was harder than I had first imagined and something I was mindful of when I visited and observed other classes as it was a threat to fidelity. The intervention, despite only requiring five minutes, required significant planning to ensure the timings of the phonic lesson worked.

Activities:

- First and foremost, the activities were fun. Of course some activities were preferred over others which is perhaps an unintended benefit of repeating some of the activities. Whilst children, on the whole, preferred the online games, I was pleasantly surprised that they enjoyed the stories (such as Tanka Tanka Skunk) and using mirrors to visually see themselves segment words syllabically.

- The ‘syllable rule’ lessons did, however, feel more instructional and I personally felt that the rules made far more sense to the children in the lesson which followed when they could apply the rules to reading and spelling polysyllabic words. I subsequently reflected on how I could make the teaching of the rules more enjoyable in readiness for the second cycle and one way would be to have more hands-on resources. For example children would have a velcro strip with words on which they could then physically chop into syllables.
- Maintaining the routine over the 25 weeks was much easier than I had anticipated. Of course my own drive and vested interest helped, but because this was an ‘addition’ to an existing lesson as opposed to something completely new, it made getting into the routine of teaching it much simpler.

(F) 4, The AR process: post-intervention

F.4.1 June 2017 - July 2017

At the end of the intervention, I had the data of just under 300 children. I had their pre-test and post-test results and I was able to average the progress made by the classes, the years and the different treatment groups as a whole. In the final week of term I used the averages I had compiled to create descriptive statistical graphs which figuratively represented my findings. Whilst very much a preliminary analysis, it was important that I used the July 2017 INSET to share these findings with colleagues who had worked tirelessly in implementing the intervention throughout the year. I wanted them to have some kind of outcome before going on summer holiday. Despite presenting the analysis as tentative, I felt this was better than waiting for September when staff would have 'moved on' and were thinking about the next year.

F.4.2 July 2017 - September 2017

I began by transcribing the interviews. Getting the layout of the page 'right' was more than just making the analysis aesthetically pleasing. I had hoped that getting the table 'right' would make the three stages of coding (Creswell, 2003) easier and would also enable me to reference information clearly. Consequently I devised a table which enabled me to do this and Table F.4.2 is an example:

Table F.4.2 An example of interview transcription

Ref	Speaker	Speech	Notes
1	Me	Hello [...] urm [...] I am just going to put this [microphone] in the middle so that it can hear everybody [Me places the microphone on the table]. You just need to speak to it in a normal voice. Urm, [...] just in a normal voice like when you speak to me. Everyone say hello.	
2	Child 1.1 Child 1.2 Child 1.3	Hello.	

It was important to be able to refer to any given line in an interview, know who was talking, what was said and to have the option to code it later. When typing up the interviews I was conscious that I wanted to include additional information which might not always be conveyed in words. Therefore I included every hesitation made by representing it with the letters ‘urm’. I also denoted pauses over three seconds with ‘[...]’ and any additional information which might be useful to the reader I included through the use of ‘[italics]’. The names of each child were made anonymous with a code (as described in C.4.3) and ‘Me’ is a reference to myself as the principal interviewer.

Having typed up all the interviews, I needed to begin the coding process. To do this I had to decide upon the major themes coming from the interviews and then an appropriate code for each theme. As already mentioned I was aware that this would be something which would require me to decide what would work best for me (Parson and Brown, 2002; Birks and Mills, 2011). Whilst influenced by Mertler (2017) this ‘axial code’ needed to be something the computer could search for at the end of my coding process. Therefore I ensured the codes were obscure enough that they could not be mistaken for anything else. For example, if I had made the code for spelling: ‘sp’ or ‘spell’, when I asked the computer to find the code it would have falsely identified it within words such as sp<u>sp</u>ring or sp<u>sp</u>ace. Therefore I included characters as well as letters for each of the codes and a table listing these is presented in subsection D.2.3.

Once I had coded the transcripts, I used the search function to count the number of times each theme was mentioned in each interview in autumn and summer. Then, I began my

'selective coding' by asking the computer to find references with certain codes, and started to subcategorise them into separate 'trees'. For example, once I had collected all the examples of 'Positive Spelling' (++ S=G), I subcategorised them into five further trees:

1. Positive Spelling Subcategory 1: Writing is enjoyable

2. Positive Spelling Subcategory 2: Difficulty with spelling is seen positively, it is seen as working hard

3. Positive Spelling Subcategory 3: Persevering with something difficult (spelling) is associated with teacher's reward

4. Positive Spelling Subcategory 4: Spelling words is associated with confidence

5. Positive Spelling Subcategory 5: Spelling and its link to creativity

After transcribing, coding and subcategorising the interviews, I felt ready to hand a copy of the staff interview transcript back to colleagues to allow 'member checking'. I also asked for participants to look through my transcripts from the children I had interviewed as 'critical friends' and question the format, code and content of each transcription. Once this had all been checked I began to analyse the data.

F.4.3 September 2017 - May 2017

The aim of the quantitative strand of my mixed methods was to give me a breadth of understanding. This breadth corresponded with a vast amount of data. Consequently, my first step in analysing the quantitative data was to collate anything relevant for each RQ. I had three RQs which would be underpinned by quantitative analysis, so for each of these questions I created a separate document which had all the necessary data easily accessible.

The descriptive statistics which I shared with staff in the June INSET tentatively indicated that the participants who received the intervention had made progress in reading and

spelling. I now needed to check the significance and used SPSS to carry out a *t-test* with the aim of using *Cohen's-d* to check the effect size (Muijs, 2004). The *t-test* has, like most tests, requirements which needed to be met, one being that it was normally distributed. My data did not meet this requirement which led me onto exploring the 'Mann-Whitney U-Test' which is considered the non-parametric equivalent of *t-tests* (Ruland, 2018; Milenković, 2011). My data met the requirements of the Mann-Whitney U-Test and this not only allowed me to compare the two matched groups, the inherent ranking aspect of the test also allowed me to explore outliers on an individual basis. For each comparison, I was interested in whether as a result of the independent variable, the children made significant progress in measurements of the dependent variable. This would only be significant if there was a large enough difference in the U Statistic.

F.4.4 Conclusion

To conclude section F, it is perhaps clear to the reader that there were many unexpected difficulties in implementing the intervention. Having said that, my overall experience of carrying out the research was reaffirming. Like most teachers, I entered the profession because I found making a difference rewarding. The thought that this intervention might benefit more than just my own class drove me forward and motivated me to do the best that I could. I could also see, first hand, the transformative effect it was having on colleagues who were equally engaged in the AR. The next section (G) discusses in greater detail some of the successes and disappointments to conclude what I have learnt from undertaking this 25 week intervention.

Part G - How does the research contribute to the academic community?

(G) 1, What have I learnt about AR?

First written August 2018, final edit April 2021.

G.1.1 Introduction

Throughout this thesis I have endeavoured to adhere to the ‘reflection’ and ‘action’ cycle as listed by Kindon (2007) (which I presented in subsection A.3.4). This section (G) marks the conclusion and therefore the last ‘reflection’ and ‘action’ cycle as detailed within the table (I have copied the last two boxes for ease of reference in table G.1.1 below but the entire cycle can be read in table A.3.4).

Table G.1.1 The Final AR Cycle

Phase	Activities	My response
Reflection	Evaluate action and process as a whole	(*find more in section G.1*).
Action	Identify options for further participatory research and action with or without academic researchers	(*find more in section G.2)*

One of the core principles of AR is that cyclical reflections help the researcher to better understand the issue at hand by engaging in a perpetual improvement cycle (Hine and Lavery, 2014; Stringer, 2008; Morales, 2016; Macros and colleagues, 2009) and therefore this section will seek to ‘evaluate action and process as a whole’ (Kindon, 2007). Many

scholars have modelled the cyclical process of AR (Stringer, 2007; Backman, 2001; Riel, 2008) but my understanding of the literature is that they all roughly follow the same four steps as listed by Anderson and colleagues (2007: 20), namely:

(1) To develop a plan of action to improve what is already happening,
(2) To act to implement the plan,
(3) To observe the effects of action in the context in which it occurs and,
(4) To reflect on these effects as a basis for further planning and subsequent action through a succession of cycles.

This section will therefore be broken down into Anderson's four steps, albeit with numbers 3 and 4 somewhat amalgamated. It will begin by looking at what I have learnt about planning a piece of AR. It will then discuss what I have learnt about implementing the intervention, both as an insider as well as an outsider. Finally it will conclude on what I have learnt about analysing the data and the subsequent impact of carrying out a piece of AR.

Hopefully, carrying out this final cyclical reflection, will allow me to truly consider the impact of my EdD, both personally, as well as on an institutional level (Macros et al., 2009) and in doing so contribute to the wider academic community by sharing my account of how new knowledge was constructed.

G.1.2 What I have learnt: planning an AR project

I believe I can condense what I have learnt about planning a piece of AR into two key principles. First, the dichotomy of 'reflection' and 'action'. Second, the complexity of planning research with others.

Similar to other AR projects, my intervention stemmed from an observable problem I had noticed in my day-to-day teaching (Lebak and Schule, 2014; Tekin and Kotaman, 2013) which I had sought to solve through the process of reflective cycles. My experience of carrying out these 'cycles' as a researching professional was that I was always torn between balancing the benefit of 'reflection' with the necessity of 'action'.

One example of this dichotomy was the subsequent difficulty I had in establishing statistical significance in the progress the children made in the SWST and SRT. When reflecting back on my research design it is apparent that I had focused much of my time before the intervention on piloting the syllable screener in an effort to improve its validity (Arnold et al., 2009; Thabane et al., 2010). With regard to the SWST and SRT I had assumed it would be appropriate to use them as they were: (1) already used in both schools, therefore common practice, (2) they were both packaged as standardised assessments, therefore giving accurate and measurable data and, (3) I had used them for my MSc research (although this could not be classed as 'pilot work' as it was not a small scale trial run of the main study (Benger et al., 2016) nor was it a feasibility study (In, 2017)). Nevertheless, as presented in the intervention findings, the children who received the syllable intervention may have made greater progress in the SWST and SRT but this was not statistically significant. The question therefore presented itself: with greater piloting work might I have discovered sooner, rather than at the end, that the tests were not wholly appropriate for measuring this phenomenon and subsequently looked at alternative testing instruments? Of course, using different instruments may not have changed the outcome of my research and could have brought their own problems. As I stress in my conclusion, it is important to accept that there may, in fact, be no causal relationship, but I am mindful that my research would have benefited from piloting more aspects of my intervention.

Crucially, however, when I took the decision in June 2016 to start my intervention in September 2016, I was mindful of school life and the fact that I had worked closely with colleagues across two schools for two years (from September 2014 to September 2016) to reach my research design. I had piloted my syllable screener and passed my registration viva in the late spring of 2016. Testing further instruments, or even other aspects of the intervention were obviously open to me, but I was also conscious that delaying the intervention to autumn 2017, rather than autumn 2016, would risk losing the momentum of staff and stakeholders (as subsections C.5 and F.2.1 explain, I was adamant I would coincide the start of the intervention with the beginning of the academic year, and not half way through, so had I missed the start of autumn 2016 I would have waited 12 months). Therefore, I made the decision to trust the appropriateness of the standardised assessments in expectation that I could capitalise on the staff engagement and 'buy-in'.

This was a tradeoff, which at the time felt 'right'. Similar compromises had to be struck with the length of each intervention session, the staff who were involved - both within school as well as schools in general, who carried out the assessments (the compromise with Year Three in School A) and how the sessions would be taught. All of these decisions are explained in detail in Section F. The key concept to bring to the fore in this conclusion, however, is that all these decisions return to the identity forming process I discuss at the very beginning of this thesis in subsection A.2.4 of navigating 'pinch points' within my AR journey.

The second key learning point of planning my AR was the complexity of working with others. One of the commonly cited benefits of engaging in AR with colleagues is that the calibre of my research can be enhanced by collective action (Morales, 2016; Holter and Frabutt, 2012; Clauset, et al., 2008; Anderson, 2007). As Mercer (2000) notes, engaging others in the planning process allowed the wealth of knowledge stored in staff bodies to be shared productively. What I learnt about engaging with others, however, was that this dynamic changes when the plan starts to be implemented. Whilst I was drawn towards an AR approach because I wanted to be an 'insider' observing the issue first hand, I quickly realised that I was an 'outsider' in almost every situation other than my own classroom. Even when talking to colleagues informally in the staffroom, there was a professional distance which I was unable to fully break down. In School B this was exacerbated further by the geographical distance and in neither school did I feel I was seeing the true reality of the classrooms as an 'insider'.

Unpicking this issue further, it was increasingly clear to me that this distance might be partly attributable to my work being attached to a university degree, although Riley and colleagues (2003) rightly note that other aspects of identity such as gender and background may also play a role. Nevertheless, as Karnieli-Miller and colleagues (2009: 281) note:

> "*Relationships are affected by the content of the inquiry, and equally by the institutional context in which the study is carried out and by researcher and participants' personal motivation*."

Paradoxically, I found that my research created an innate power-dynamic which I found difficult to overcome. This is perhaps even clearer now, having finished my data collection

and subsequently working with colleagues on new AR projects without any university affiliation. The staff interactions and dialogues feel noticeably different to when I carried out my work; they are less measured and cultivated and instead conversation is organic and free flowing. Consequently, I found there to be a conflict between my desire to use my EdD as a vehicle to discover the true reality of an issue I was faced with within an educational setting, whilst also being inherently hindered by the very same label attached to the degree.

G.1.3 What I have learnt: implementing an AR project

Stibbard and colleagues (2020) note that challenges are to be expected in any research study. Nevertheless, I found maintaining good fidelity across the intervention extremely challenging. This, perhaps, reflects more my naivety going into the intervention, not just in terms of underestimating the energy and time it would require to manage all of the different classes but also the fact that much of it would ultimately be out of my control, for example the confounding variables of teaching (Jones, 2010). As subsection F.3.2 explained, I had endeavoured to put everything in place to support colleagues but, as Garcés and colleagues note (2016), the quality of AR is largely dependent on the professional development of those involved and managing this variability will always be difficult.

Nevertheless, tackling fidelity forced me to be proactive in putting into place support which would enable teachers to succeed with the intervention. This was a tremendous learning opportunity as it required me to list possible problems teachers might have with implementing the intervention before it began and then put in place pre-emptive measures. At the top of this list was time. I was conscious that, like most AR projects, it might become time intensive (Cain, 2019; Hine and Lavery, 2014), not necessarily because of the time it took to teach each intervention session but rather the span of the research taking three sessions across 25 weeks. This risk to ‘time' impacting fidelity was great. Either teachers might realise the demand this intervention was having too late and therefore force them to cut corners (Waters-Adams, 2006; Morales, 2016), or even push some staff to stop taking part altogether (Morales, 2016). Therefore I knew that every effort I made to reduce the demand on time would potentially result in a more positive uptake in the work. In doing this, I found myself returning to the idea of ‘pinch points’.

Linked with ‘time’ is the reality that teachers may lose motivation during the intervention process. Consequently, I realised that along with reducing the impact of time, I would also have to ensure I was motivating staff throughout the 25 weeks. I endeavoured to mitigate this through weekly emails and checking in with all staff regularly.

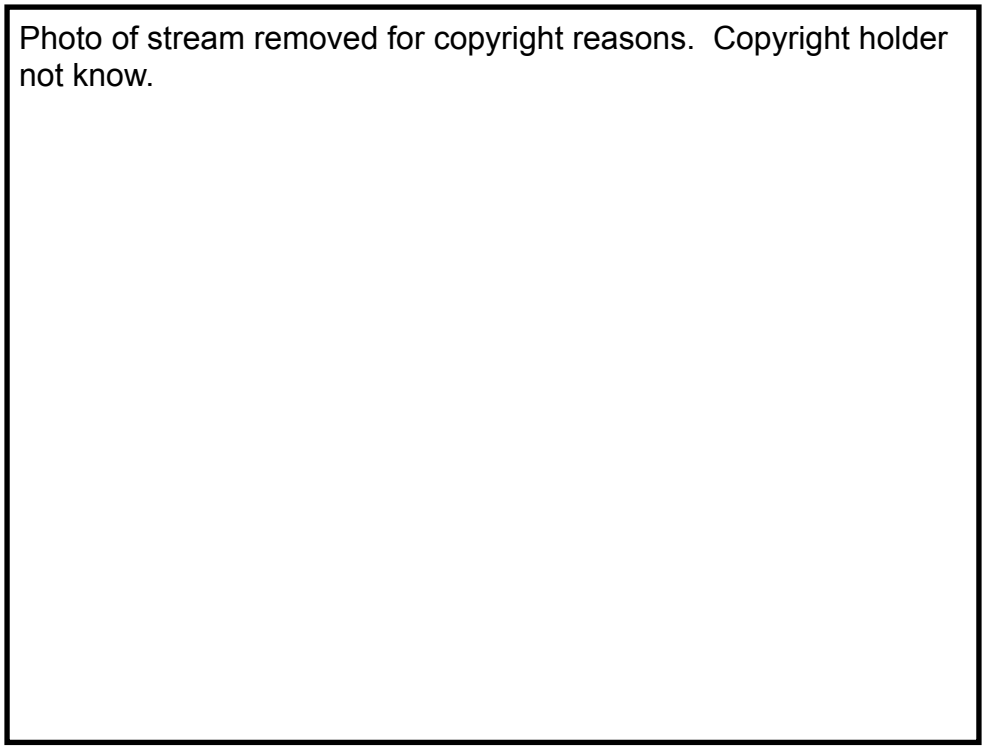
G.1.4 What I have learnt: impact of AR on myself and others

On a personal level, this AR has impacted me in two ways: my teaching and my wider professional development.

First, AR is principally aimed at improving the practice of the researcher (Dewey, 1933; Lewin, 1948) by advancing new knowledge (Morales, 2016; Chevalier and Buckles, 2019). In this respect, planning and implementing my intervention has undoubtedly improved my own knowledge of phonics, reading and spelling. It must also be stressed, however, that the act of reflecting on one’s own practice has benefited my teaching. In other words, by reflecting critically on the steps needed for children to learn, it has helped me understand how to teach these skills effectively (Allott, 2019; Cordewener et al., 2018). For example, my improved understanding of the literature on how children progress developmentally through different reading and spelling phases has helped me plan my teaching better to ensure I supported all children with the tools they need to succeed. In addition, however, by reflecting on how I was teaching these skills I also improved my delivery of phonics, for example focusing on oral blends with children who had not yet reached the mini-milestone whilst giving those children in the class who were becoming independent readers better self-correction skills.

In section A.3 I argued that many of the benefits of solitary AR are positively compounded when working with colleagues. For example, all of the ways in which this AR has improved my own practice can also be applied to those who worked with me in carrying out and analysing the data from the intervention. In this respect it returns to Flutter’s (2016) ‘ripple’ metaphor, which I have conceptualised in Figure G.4 below.

Figure G.4 Perceived Impact



In section E I shared some of the analysis from teacher interviews which supported the literature that teachers are not always confident in how to teach syllable skills (Duanmu, 2009; Bhattacharya and Ehri, 2004; Henderson, 1985). Consequently, as it did for me, the intervention supported those staff who taught the syllable material to improve their own subject knowledge. Furthermore, for all teachers, irrespective of which strand of the intervention they taught, the intervention encouraged them to reflect, and question, current practice (Morales, 2016; Holter and Frabutt, 2012; Clauset, et al., 2008). By sharing the wealth of knowledge within the school community (Cain, 2019; Mercer, 2000) we found that phonic practice was improving for all teachers. This was principally by encouraging staff to engage more in what they were doing and why; returning to Allott (2019: 106) there is a, “close relationship between the ability to reflect on one’s spelling and spelling performance.”

Second, I believe the process of carrying out AR has also developed my professional development in three main ways. First, in an obvious and practical level, my experience of leading an intervention, motivating colleagues and constant trouble shooting has helped me acclimatise to the demands of subsequent management roles I have stepped into.

Second, Cain (2019) refers to school environments as ‘messy’ and the same underlying importance of making the ‘right' decision during my intervention still rings true in my position as a line-manager to others. I still find myself navigating ‘pinch points’; weighing up when to ask ‘more’ from colleagues, whilst also anticipating when ‘enough-is-enough’ and seeking opportunities to lighten workload.

Third, the experience of trying to improve the professional development of others with my intervention has helped me think more critically about the way I try and support colleagues in the future. In this respect, I have begun the rewarding process of ‘coaching’ colleagues (Dudley, 2013) as an effective way to support staff by encouraging them to reflect on their own practice. I have also presented new initiatives to staff at INSETs and talked strategically with other schools about their phonics practice.

Ultimately, all this culminated in me seeing firsthand how transformative the empowering effect of AR can be at an individual, as well as institutional, level (Hine and Lavery, 2014, Lebak and Schule, 2014; Pain, 2012). In School A this was achieved by encouraging those staff involved to be a part of constructing knowledge (Ripamonti et al., 2015) through regular meetings where we discussed the literature and the plan for the intervention. It also ‘rippled’ into other areas of AR where staff who were involved felt inspired to carry out their own research and therefore saw their own mindset shift to become life long learners (Garcés and Granada 2015). Whilst the staff have always been forward thinking, AR has now woven itself into the very fabric of the school.

An example of this is the formation of a ‘research hub’ in School A. I presented this thesis (at that stage incomplete) at the first meeting to get critical feedback which proved invaluable. Since then colleagues have come together to share readings, discuss new topics or outline small-scale AR projects. Furthermore, three of its members have gone on to pursue a Masters in education and one has now begun their own EdD! Ultimately, this has all led to pupils benefiting, as the teachers’ focus on self reflection has resulted in changes in their teaching practice which act in the best interest of the pupil (Sweetland and Hoy, 2002).

G.1.5 Final words

The aim of this section was to conclude Kindon's (2007) final evaluation phase of carrying out a piece of AR. My evaluation of the impact has centred largely on the process of carrying out a piece of AR and focused further on its ability to empower all those involved in the research. I split this empowering impact into both the surface level improvement in subject knowledge and professional development but also alluded to the deeper shift in mindset which occurred in creating lifelong learners. The power of engaging in reflective cycles did not just improve the rigour of the research, it encouraged all involved to critically reflect on their own practice. Staff involved witnessed the change AR had on their own teaching and a testament to its allure is that colleagues have gone on to pursue their own MScs and EdDs as a result.

Of course, not everything I learnt was positive and this section also reflected on some of the struggles and disappointments. Principally these centred around fidelity and the practicalities of carrying out an experimental design as part of an AR project. Whilst quasi-experimental designs are common within post-positivist approaches to research (Creswell, 2018; Lor, 2011) and post-positivists have embraced the AR design as a way of studying the world around them (Mertens, 2005), the reality of implementing this is far from text book. Engaging in reflective cycles does not always marry with term dates and taking the time to perfect methodology does not always account for colleague momentum.

Therefore to conclude, notwithstanding everything already mentioned regarding its ability to empower, I have come to appreciate that my identity as a professional researcher over the years has grown, albeit at times stretched, by navigating the endless 'pinch points' of decision making. When I designed the Double Helix (figure A.2.4.2) in 2017 I could never have imagined that it would still hold so much value four years later; but it continues to encapsulate my experience of carrying out this project. Teachers are, unlike many other professions, forced to make decisions because there are no 'pre-prescribed' or 'off the peg rules' (Carr, 2012). For this reason, I hope my thesis is able to contribute to the extensive and growing literature (Mertler, 2017; Garcés et al., 2016; Lebak and Schule, 2014; Rodgers, 2002; Pain, 2012) which documents the empowering effect AR can have on all involved.

(G) 2, Areas for further research

Written in September 2017, final edit April 2021.

G.2.1 Introduction

Subsection G.2 is tasked with presenting the key areas for further research. In doing so, however, it will hopefully neatly conclude the two strands of this 'play within a play' by presenting an area of further interest for each: both my interest in early literacy development, as well as a my experience of carrying out research within an educational setting.

Each of these areas is formed from the main shortcomings raised within the thesis. Therefore, it will hopefully indicate to the reader how I propose to continue learning and in doing so exemplify a core principle of AR that outcomes drawn from research are simply the beginning phase of subsequent pieces of research (Tekin and Kotaman, 2013).

G.2.2 Areas for further research: literacy intervention

My areas for further research into literacy based interventions would focus on two main strands: (1) the testing instruments, as well as (2) the intervention material itself. In my data analysis in section E, I reflect on the possibility that the testing instruments may have had shortcomings which affected the research. For example the difference being measured in both standardised assessments was too small. In other words, measuring reading and spelling progress in months may have, in hindsight, made it difficult to discern any significant patterns. Notwithstanding this, the choice of standardised assessments may also have been incorrect, for example the SRT and SWST might not have been comprehensive enough to measure the full effect of the intervention. Grabe (2008: 357) lists 14 key components which standardised reading assessments can assess, namely:

1. *Fluency and reading speed*
2. *Automaticity and rapid word recognition*

3. *Search processes*
4. *Vocabulary knowledge*
5. *Morphological knowledge*
6. *Syntactic knowledge*
7. *Text-structure awareness and discourse organization*
8. *Main-ideas comprehension*
9. *Recall of relevant details*
10. *Inferences about text information*
11. *Strategic-processing abilities*
12. *Summarization abilities*
13. *Synthesis skills*
14. *Evaluation and critical reading*

The SRT (McCarty and Lallaway, 2012) which I used focused mostly on points 1 and 2, as listed by Grabe. One of the arguments I make in the literature review is that syllable awareness reduces cognitive load (Ehri, 2005; Elliott, 2017; William, 2017) therefore freeing up capacity to comprehend - this is, however, not assessed in the SRT. Comprehension is instead assessed in other popular, school-used standardised assessments such as the 'York Assessment of Reading for Comprehension' (a GL assessment, developed by the University of York, 2009). This would, therefore, be worth exploring.

Similarly, initial research into alternative spelling assessments such as the 'Diagnostic Spelling Tests' (Crumpler and McCarty, 2006) showed that other standardised spelling tests could give a more rounded and holistic view of spelling progress through the choice of words tested. Similarly, the updated version of the SWST by the National Foundation Educational Research (NFER, 2016) (for my intervention we used the 2007 NFER spelling test) showed that it had a better emphasis on spelling polysyllabic words, in particular focusing on morphemic rules such as prefixes and suffixes.

Linked with this, the importance of prosody played a central role in my literature review both as a starting point for phonic development as well as the perceived difficulty some children have with it. Consequently, it would have been useful to explore this concept of 'hearing' syllables more in assessments. Bridges and Catts (2011) already explore this using the Initial Sound Fluency (ISF) which is a subtest of Dibels but further research into

suitable tests would potentially contribute to this growing area of current academic literature.

Regarding the intervention itself, since completing the intervention I have been interested in the concept of ‘fidelity’ from a pharmaceutical perspective. In this field ‘fidelity’ is often linked with ‘dosage’ (Trickett et al., 2020) which has made me return to another potential shortcoming in my research which was whether the time I had dedicated to the intervention (i.e. the ‘dosage’) was simply too small. Whilst 3 x 5 minutes felt appropriate and manageable amongst staff, this may have been a decision which in hindsight benefited the workload of the teacher more than the outcomes of the research. This is especially the case when comparing my work with other research within the field, for example Tarraran (2018), who had allocated 45 minutes for each intervention. Linked with this, further research would also involve exploring what type of syllable intervention would be best. Whilst my data analysis statistically proved that the intervention improved syllable awareness, further research would allow me to make the teaching material more efficient for teachers and, most importantly, pupils.

G.2.3 Areas for further research: AR

Perhaps the area of greatest interest moving forward is exploring the relationship of experimental research methodology within an educational setting. As already mentioned, whilst the two are not incompatible or dynamically opposed (Mertens, 2005), my experience of carrying out my own experimental design in the ‘messy environments of school’ (Cain, 2019) has resonated with Walser (2014: 1) who notes that, “educational evaluators and school leaders are often faced with challenges when implementing such [Quasi-experimental] designs in educational settings.” Therefore, whilst Mertler (2017) writes that quasi-experimental research is best placed to uncover true cause and effect, does there need to be greater malleability in its implementation?

With that in mind I have begun to look more at Design Research, in particular familiarising myself with the work of Bakker (2018). Whilst my knowledge of this approach is still developing, my initial understanding is that Design Research is similar to AR as it is also an interventionist approach with the aim of closing the gap between theory and practice

(Bakker, 2018). Design research also aims to empower participants (Trimmer, 2020) and engages in reflective cycles like AR (Opie and Sikes, 2004). Furthermore, it would investigate issues raised in the classroom by incorporating research theory and the creation and implementation of interventions (Bowler and Large, 2008). As the names 'design' and 'research' suggest, the focus does differ from AR in that the design must be researched based. Therefore, whilst I had 'designed' my intervention based on the phonics literature, the teaching material itself was not based off research, something which is explicitly required as part of design research (Bakker, 2018). Most importantly, I have been particularly interested in the work of Pool and Laubscher (2016: 51) who comment,

> "*[our research] illustrates the effectiveness of using design-based research, as a suitable methodology in a short-term project, in this case a PhD dissertation.*"

Pool and Lauscher rightly point out that the inherent repeated cycles lend themselves to longer term projects. This is something I experienced with my AR and I struggled at times balancing further cycles to improve rigour with the inescapable time constraints I was under. The outcome of the above research, specifically in its use of 'micro- and meso-cycles,' is something I would like to explore further. In particular, I would be interested in whether it is in fact a more appropriate method for further research exploring the effectiveness of a literacy based intervention. This brings us back to an earlier observation in subsection C.2.2, that any conclusions drawn from research are simply the beginning phase of another, subsequent, piece of research (Tekin and Kotaman, 2013).

Part H - Appendix

(H) 1, Letter to my Headmaster

Below is a letter I sent my Headmaster outlining my proposed project which was agreed to.

Dear […],

I am writing to formally ask permission to conduct research in your school this academic year (Starting in September 2016). As you know, I am studying for the Doctorate in Education at Cambridge University, supervised by […]. In my research project - the relationship between syllable awareness and reading/ spelling - I will explore how improving syllable understanding could help children with reading and spelling. This research will directly build on the research I carried out at [school name] in 2012 as part of my MSc in Learning and Teaching at Oxford University.

The research will involve comparing the results from a pre-test and post-test in reading, spelling and syllable awareness. I plan to do this using our existing data tracking (Salford reading test, Single Word Spelling Test and a syllable segmentation assessment). The research would look at the differences and similarities between a synthetic phonic group and a syllable group. The syllable group would receive a 'new' synthetic phonics programme. In short, this would be the same phonics programme that was already being taught with the addition of **one extra syllable segmentation game**. The synthetic phonic group would also receive a 'new' synthetic phonics programme. This would be similar to the syllable group except they would have one **extra phoneme segmentation game**. This design would go some way in negating the placebo effect: i.e. the group with the 'new' programme sees change simply because it is new as opposed to the actual intervention. This way I can argue both groups had a 'new' programme.

I would like to try and collect data over two years in both the Pre-Prep and Lower School. This is because one of the ethical considerations of conducting a pre-test/post-test intervention is how you justify withholding something you think is beneficial from children. To negate this criticism I will expose all children to the syllable intervention in the second year. That way no child will have the intervention withheld from them, simply delayed.

[Head of Early Years - doctorate qualification] and [Deputy Head of Pre-Prep - MSc in education] have agreed to collaborate with me on this piece of research.

By participating in the research, the school would be assisting in a project, which will, I hope, contribute towards an understanding of how best to support boys with literacy difficulties. I hope to show that improving children's ability to segment syllables improves their decoding skills and gives them greater confidence with spelling and reading.

To conduct this research I would require access to the boys' assessment data, including reading and spelling scores. In addition I would also like to conduct a preliminary syllable recognition screener to identify a base level of understanding. To increase the depth of my analysis, I would like to interview the boys to check if attitudes towards reading and spelling improve as a result of the intervention.

Cambridge University have strict ethical procedures on conducting ethical research with teachers and young people, consistent with current British Educational Research Association guidelines. Throughout the research, students and other teachers will be able to refuse to participate in any research activities at any time.

All participants, including students, teachers and the school, would be made anonymous in all research reports. The data collected would be kept strictly confidential, available only to my supervisor and myself and not used other than as specified without further consent. All work would be destroyed at the end of the research period and kept in locked conditions until then.

If you feel you would like, or need, more information about what is involved, please let me know.

Yours sincerely,

Christopher Halls

(H) 2, Ethic checklist

Below is my completed ethical grid as questions and mapped against key guidance from Cambridge University, Faculty of Education.

Based on paper:

- *Stutchbury, K. and Fox, A. (2009). Ethics in Educational Research: introducing a methodological tool for effective ethical analysis, The Cambridge Journal of Education, Volume 39, Number 4, pp. 489-504.*

- *British Educational Research Association (2011). Ethical Guidelines for Educational Research. London: BERA. Available at: https://www.bera.ac.uk/wp-content/uploads/2014/02/BERA-Ethical-Guidelines-2011.pdf, last accessed on 04.04.16 at 12:14.*

I am aware that the Cambridge University, Faculty of Education Ethic Guidelines changed in 2018. I have read these guidelines but decided to include the pre-2018 guidelines as these were the ones I submitted for my Registration Viva.

Table H.2.1 Ethical Considerations - External and Ecological

Focus	No.	Questions to consider	Issues
Cultural sensitivity	1	Are the values, norms and roles in the environment in which I am working likely to be challenged by this research? How could I adapt to accommodate these norms and expectations?	Values *Both schools have expressed a wish to critically reflect on their phonics practice. This research stems from a desire to improve teaching, therefore both schools are receptive to the research.* Norms and Roles *The intervention will take place in pre-existing phonic lessons. Children will remain in their normal classes/groups and consequently the disruption felt will be small.*

Awareness of all parts of the institution	2	What is the relationship between the group/individual I am working with and the institution as a whole? How does it affect the participant(s)?	My school *The intervention will take place in pre-existing phonic lessons. Children will remain in their normal classes/groups and consequently the disruption felt will be small.* Second School *The intervention will take place in pre-existing phonic lessons. Children will remain in their normal classes/groups and consequently the disruption felt will be small.* My Relationship *Apart from working with one group (this could either be the syllable or synthetic phonic group dependent on the results from the matched control) my role is predominantly an organiser and facilitator.*
Responsive communication – awareness of the wishes of others	3	How might my work be viewed/ interpreted by others in the institution? Have I considered how language I use could be interpreted?	Possible issues *The teachers are aware of my research through meeting with them. As with any new initiative, to fit it in to a busy schedule requires me to work positively with all members of staff.* *I will be working with a new school. I will need to build relationships with the staff at the new school.*
Responsibilities to sponsors	4	What are my responsibilities to the people paying for or supporting this research (local authority, my school, external bodies)?	My School *My school has contributed a third of the tuition fees under its commitment to CPD. Consequently the support financially is in recognition of my professional development as opposed to requiring something from the research. Having said this they are, of course, invested in the intervention and the implications of the research will affect the school.*
Codes of practice	5	Have I worked within the BERA (2011) guidelines? Am I familiar with the University's internal approval procedure? Are there other relevant codes applicable, for example the UN Rights of the Child, ESRC guidance? Am I aware of my rights and responsibilities through to publication?	BERA *I went through a CUREC at Oxford University for my MSc action research which required me to adhere strictly to the BERA (2011) guidelines.* Literature *I have also improved my own understanding of ethics through the reading of:* *- Chappell, T. (2009). Ethics and Experience, Life Beyond Moral Theory, Durham, Acumen Publishing.* *- Simons, H. and Usher, R. (2000). Situated Ethics in Educational Research, London, Routledge.* *- Griffiths, M. (1998). Educational Research for Social Justice, Getting off the fence, Buckingham, Open University Press.*

The law	6	What legal requirements relating to working with children do I need to comply with e.g. DBS checks? Am I aware of my data protection responsibilities, including the Data Protection Act (1998)? Am I aware of the need to disclose criminal activity?	DBS *I have an up to date DBS check.*
Risk	7	Have I considered in advance any risks to anyone as a result of this research?	Minimal Risk *The intervention will collect data that is within normal school practice. The research will require me to interview children. I will do this in threes to minimise the children feeling uncomfortable and the interviews will be optional.* *All data kept secure in a locked cupboard.*

Table H.2.2 Ethical Considerations - Consequential and Utilitarian

Focus	No.	Questions to consider	Issues
Benefits for individuals	8	What are the benefits of me doing this research to the participants? Would an alternative methodology bring greater individual benefits?	Good Possible Benefits *If the research shows that syllable segmentation helps early literacy development then the children involved (and subsequent children in the school) will benefit directly.* *The intervention is a pre-test post-test quasi experimental design which means that one group of children will not have the intervention. I have considered this ethical dilemma and propose that participants are not withheld the intervention instead it is delayed. This is what Kellett and Nind (2005) note as a 'multiple-baseline interrupted time-series design'. The first year would see the cohorts I am interested in split into syllable and synthetic phonic. The second year all participants would receive the intervention material.*
Benefits for particular groups/ organisation	9	What are the benefits of me doing my research to the school/ department? Could these be increased in any way? Could my work be relevant to a school's development planning or self-evaluation in any way? How will I ensure that those affected by the research will know about my findings? Can I justify my choice of methods to my sponsors?	Benefits for the school *Both schools will hopefully benefit from this as we have been looking at how children's reading and spelling progresses.* *Both schools are currently interested in improving the phonics delivery and how reading and spelling progresses through the years. This research would hopefully shed some light on these issues and contribute to the schools' development planning.* Dissemination *Ideas will be disseminated through twilight insets which I will lead and through the publication of useful concise teacher guides.*

Most benefits for society	10	Is this a worthwhile area to research? Am I contributing to the 'greater good'? Is it high quality and open to scrutiny? Am I open to improving my work by responding to constructive criticism? Will the work be accessible and made available to maximise its significance? How will I commit to communicate its findings to all potentially interested parties?	Worthwhile and 'greater good' *My research will hopefully shed some light on the ongoing and current phonics debate and reading wars. Reading and writing is such an integral part of society and the need to get it 'right' from an early age means that my research could be of value.* High quality and scrutiny *My research will be as in depth as my situation allows. The data drawn from two schools will be rich and open for scrutiny.* Dissemination *Internally I will disseminate my ideas via twilights INSETS and producing concise teacher guides. Externally I am looking at presenting my research at conferences.*
Benefits for the researcher	11	Am I going to be able to get enough data to write a good thesis? Am I aware of my publication rights? What might I learn from this project? Will it help in my long-term life goals?	Data *The data I will collect will be from my own school and another school. In the first year I will collect data from around 220 children. In the second year that will increase to 450 children. The data will be enough to write a thesis although it will be unable to make any generalisations as both schools are high achieving independent prep schools. More data would have been preferable but I needed to balance my wish to collect as much data as possible with the constraints of being manageable with a full time job.* Life goals *Early literacy development is my area of interest in education and this research is directly related to this.*

Table H.2.3 Ethical Considerations - Deontological

Focus	No.	Questions to consider	Issues
Avoidance of wrong – honesty and candour	12	Have I been open and honest **in advance** with everyone who might be affected by this research? Are they aware that they can withdraw, in full or in part, if they wish? If not, can I justify any covert aspects to my research? Have I avoided anything that could be considered as coercive? Have I grievance arrangements and communicated these?	Yes! *My research has been made clear from the very beginning to my headmaster, colleagues, and the participants. Children who I may potentially interview will have a letter sent to them asking for consent which they could deny if they wish.*
Avoidance of harm	13	Are there any sensitive issues likely to be discussed or aspects of the study likely to cause discomfort or stress? Can I ensure that I will either attempt to prevent or have thought about how to alleviate any distress caused? How will I reduce my imposition on those involved in the research?	Interviews *Interviews can cause stress and to minimise this I will interview children in threes and they will have the option to withdraw from the interview at any stage.*

Fairness	14	Have I treated all participants fairly? Can I treat all participants equally? Am I using any incentives fairly? Will I acknowledge everyone involved fairly? Do those involved want to be recognised rather than anonymised?	Quasi-Experimental-Design *Comparing the progress of an intervention in a syllable group to that of a synthetic phonic group raises the question of how it is ethical to withhold something from a group which you think is important. I have tried to reduce this risk by not withholding the intervention from the control group but delaying it.*
Telling the truth	15	If there is any need for covert research how will I deal with this? What will I do if I find out something that the participants/school/department do not like? How will I report unpopular findings? How will I deal with misrepresentation of my study by others? What are the implications of a commitment to exposing any malpractice revealed to me?	No
Keeping promises	16	Have I clarified access to the raw data and how I will share findings including at publication? How will I ensure confidentiality?	Confidentiality *All data will be anonymous. Children interviewed will be given false identities to ensure no child is mentioned by name. The school names will also be anonymous.*

Table H.2.4 Ethical Considerations - Rational and Individual

Focus	No.	Questions to consider	Issues
Establishing trust	17	Who are the key people involved? How can I build a constructive relationship with them? What do I need to do to earn the trust of participants? Do I need to involve gatekeepers and, if so, how will these relationships be developed and managed?	People *The key people involved are the children I am researching but also the staff who will be carrying out the intervention.* *I have the trust and respect from colleagues in my own school but I will still need the trust from parents and the children. This will be achieved with the letter I send home and the possibility to speak to them during one of our curriculum evenings.* *With regards to the second school trust will need to be established from all the staff, parents and children (although the intervention will be carried out by the teachers in that school so the children will be familiar with them). From March 2016 to September 2016 I plan to visit the school on at least two occasions to begin building a rapport*. Gatekeepers *No gatekeepers are required.*
Avoiding imposition	18	Am I making unreasonable or sensitive demands on any individuals? Have I minimised any bureaucratic burden on those I invite to be involved?	No *All participants have no demands placed on them and all participation is voluntary with consent given.*

Respecting autonomy	19	Do individuals fully appreciate that participation is voluntary and will gain their informed consent? Or, if I plan to undertake covert research can I make a strong defence of this choice? Will I offer participants the chance to withdraw data? If so, have I considered how practically this can be accommodated? Have I negotiated access to the participants? Are the participants clear about their roles, including my own, as they relate to expectations?	
Collaboration and reciprocity	20	Have I considered negotiating mutually beneficial arrangements? Have I made myself available when those involved might wish me to be eg. to answer queries?	Contact *All parents, children and staff are able to contact me at any time.*
Confirmation of findings	21	What steps will I take in my methodology to ensure the validity and reliability of my findings? Can I involve participants in validation? Will I report in an accessible way to those involved?	
Respect persons equally	22	How will I demonstrate my respect for all participants? Have I treated pupils in the same way as teachers? Have I ensured a fair representation of those involved in any authorship?	Equality *All participants and colleagues will be treated with respect. Children with SLDs will not be treated any differently then the rest of the cohort. All sensitive information will be kept confidential and anonymity will be ensured.*

(H) 3, Example of Interview Consent Form

Below is an example of the consent form I used:

Dear Parent/Guardian

My name is Christopher Halls, in addition to my role as a Year One teacher at [school name], I am also conducting research at Cambridge University as part of my PhD in Education. Through the research for my PhD I am aiming to find ways to help boys improve their spelling and reading through specific syllable recognition work.

The research will be conducted over two years and analyse the relationship between syllable awareness and word decoding skills. The PhD will focus on analysing current school practice and will hopefully shed light on this crucial stage in children's learning.

In addition to analysing children's decoding skills, I would also like to conduct a few small group interviews with some boys to discuss how they feel about reading and writing. To avoid bias these children will be chosen at random and I plan to tape record the interviews for research purposes. The interviews will be confidential with myself, my supervisor and my assessor being the only people who will listen to the interviews. No child will be named in the report.

The study has been approved by Cambridge University and [name of my Headmaster] is also aware of the research project and supports it.

The participation of your son in these interviews is, of course, entirely optional. If you would like your son **not** to be involved in these interviews please sign the slip below. I would like to stress that refusing consent will not affect your son in any way.

If you would like to know more about the project please feel free to contact me.

Yours sincerely

I do not want my son (print name) ..... to take part in the project.

Signed……Parent/Guardian

Please print your name……

(H) 4, Intervention handbooks

*The Intervention Handbook was a key component of the EdD research. Due to its size please find the introductory letter below followed by a link to where **both** handbooks (Version 1 for Years 2016 and 2017 and Version 2 for Years 2017 and 2018) can be accessed:*

Dear Colleague,

First, thank you for agreeing to take part in this syllable intervention. Needless to say I would not be able to undertake this research without your support.

In short, the aim of this intervention is, hopefully, to prove that giving children a more balanced phonic programme will improve attainment in reading and spelling. This will be achieved by combining synthetic phonics with focused syllable awareness work. To determine whether children's early literacy development is impacted by syllable awareness, reading and spelling scores will be compared with children who do not receive any syllable work. Instead, the comparison group will receive extra synthetic phonic activities. Hopefully, you have already been allocated a programme by the time you read this...

In the first part of the document I have written an overview for the year. The overview is broken down into terms and weeks. Each week is one block and within each square I have included three activities for the syllable group and next to it three activities for the synthetic phonic group. Within each square I have ensured that at least one of the activities does not require a computer.

This intervention is an action research project, and as such may I kindly ask that you stick to the guidelines outlined below.

1. At the end of this document I have included a lesson plan to show how the intervention material slots in at the end of a normal phonic lesson. It will help improve the validity of the intervention if the main phonic component is identical in both the syllable and

synthetic group. This will ensure the only difference is the additional intervention material.

2. It is imperative that both the syllable group and the synthetic phonic group dedicate the same amount of time to the intervention material. Each of the activities I have outlined in the middle section are designed to be done in 5 minutes.
3. Although I designed each week to contain 3 activities, this does not mean you must teach three. The only thing that is important is that everyone in the year group teaches the same amount. For example, if you are charged with teaching the syllable group and you decide you want to teach 4 sessions in a week and repeat one of them, the synthetic phonic group must also teach 4 and repeat one of them. Teaching less sessions is also fine, as long as it is, likewise, kept the same. If you are teaching less sessions I have included one activity in bold for each week to highlight which is the most important.

Finally, you will notice that the activities range between reading and spelling. It is my hope that this intervention will positively impact your children. For those children not receiving the intervention I have designed a catch up programme which can be taught the following year.

I hope you enjoy taking part in this intervention and if you have any questions please do not hesitate to contact me.

Thank you again,

Best wishes,

Christopher Halls
cjh218@cam.ac.uk

Overview of the Programs:

Edition No.	Website	QR Code
1st program September 2016 to June 2017	Website link to teaching material removed as this information was only intended for the examiner.	Website link to teaching material removed as this information was only intended for the examiner.
2nd program September 2017 to June 2018	Website link to teaching material removed as this information was only intended for the examiner.	Website link to teaching material removed as this information was only intended for the examiner.

(H) 5, Syllable Tests

Please find the links for each of the syllable tests and the corresponding answer sheets:

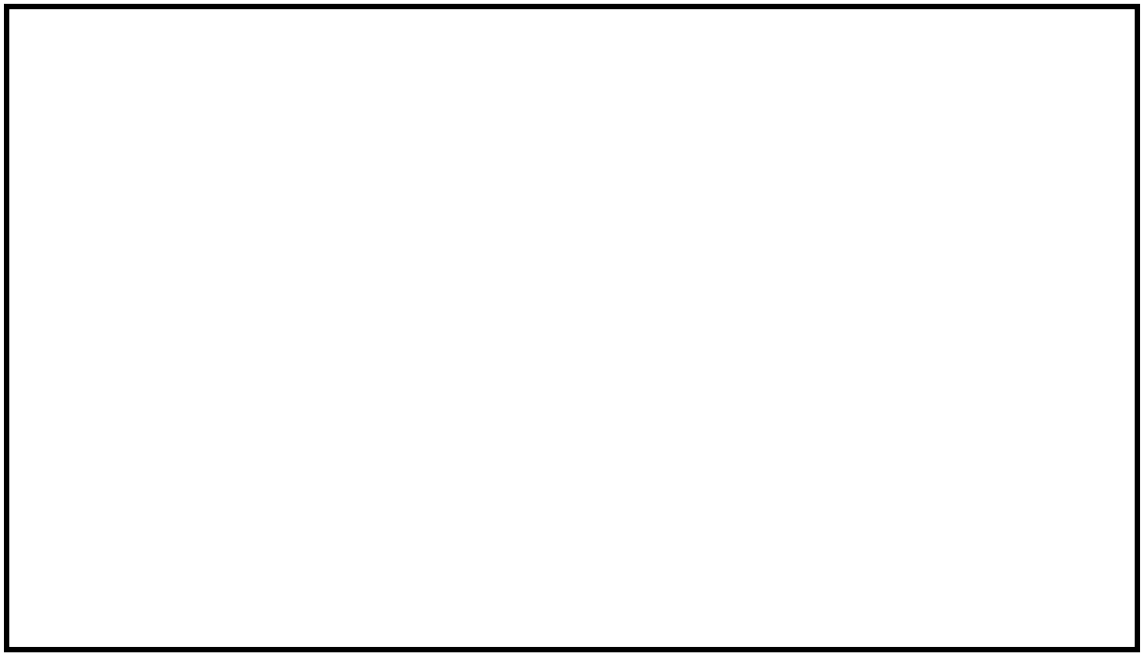
Syllable Test No.	Website	QR Code
Syllable Test 1	Website link to syllable test removed as this information was only intended for the examiner.	Website link to teaching material removed as this information was only intended for the examiner.
Syllable Test 2	Website link to syllable test removed as this information was only intended for the examiner.	Website link to teaching material removed as this information was only intended for the examiner.
Syllable Test 3	Website link to syllable test removed as this information was only intended for the examiner.	Website link to teaching material removed as this information was only intended for the examiner.
Syllable Test 4	Website link to syllable test removed as this information was only intended for the examiner.	Website link to teaching material removed as this information was only intended for the examiner.

(H) 6, Syllable Lessons

Below is an example of a syllable lesson I created to be used by teachers in the syllable group during my intervention. Following this PowerPoint, please find links for all of the syllable lessons and a PowerPoint presentation introducing the intervention:

Example of teaching material removed as this information was only intended for the examiner.

Example of teaching material removed as this information was only intended for the examiner.



Example of teaching material removed as this information was only intended for the examiner.

Example of teaching material removed as this information was only intended for the examiner.

Example of teaching material removed as this information was only intended for the examiner.

Please find links for all of the syllable lessons and a PowerPoint presentation used during a teacher INSET to introduce the intervention:

Lesson No.	Rule	Website	QR Code
-	*Inset Presentation*	Website link to teaching material removed as this information was only intended for the examiner.	Website link to teaching material removed as this information was only intended for the examiner.
1	Compound words	Website link to teaching material removed as this information was only intended for the examiner.	Website link to teaching material removed as this information was only intended for the examiner.
2	Prefixes	Website link to teaching material removed as this information was only intended for the examiner.	Website link to teaching material removed as this information was only intended for the examiner.
3	Suffixes	Website link to teaching material removed as this information was only intended for the examiner.	Website link to teaching material removed as this information was only intended for the examiner.

Lesson No.	Rule	Website	QR Code
4	-le endings	Website link to teaching material removed as this information was only intended for the examiner.	Website link to teaching material removed as this information was only intended for the examiner.
5	Double consonants	Website link to teaching material removed as this information was only intended for the examiner.	Website link to teaching material removed as this information was only intended for the examiner.
6a & 6b	Long and Short Vowel	Website link to teaching material removed as this information was only intended for the examiner.	Website link to teaching material removed as this information was only intended for the examiner.
7	Digraphs and Trigraphs	Website link to teaching material removed as this information was only intended for the examiner.	Website link to teaching material removed as this information was only intended for the examiner.
8	Split Digraphs	Website link to teaching material removed as this information was only intended for the examiner.	Website link to teaching material removed as this information was only intended for the examiner.

Lesson No.	Rule	Website	QR Code
9	r- rule	Website link to teaching material removed as this information was only intended for the examiner.	Website link to teaching material removed as this information was only intended for the examiner.

(H) 7, Semi Structured Interviews, Pupil Questions

Below, are the questions I used for my semi-structured interviews:

Questions EdD Interview - Semi structured interviews

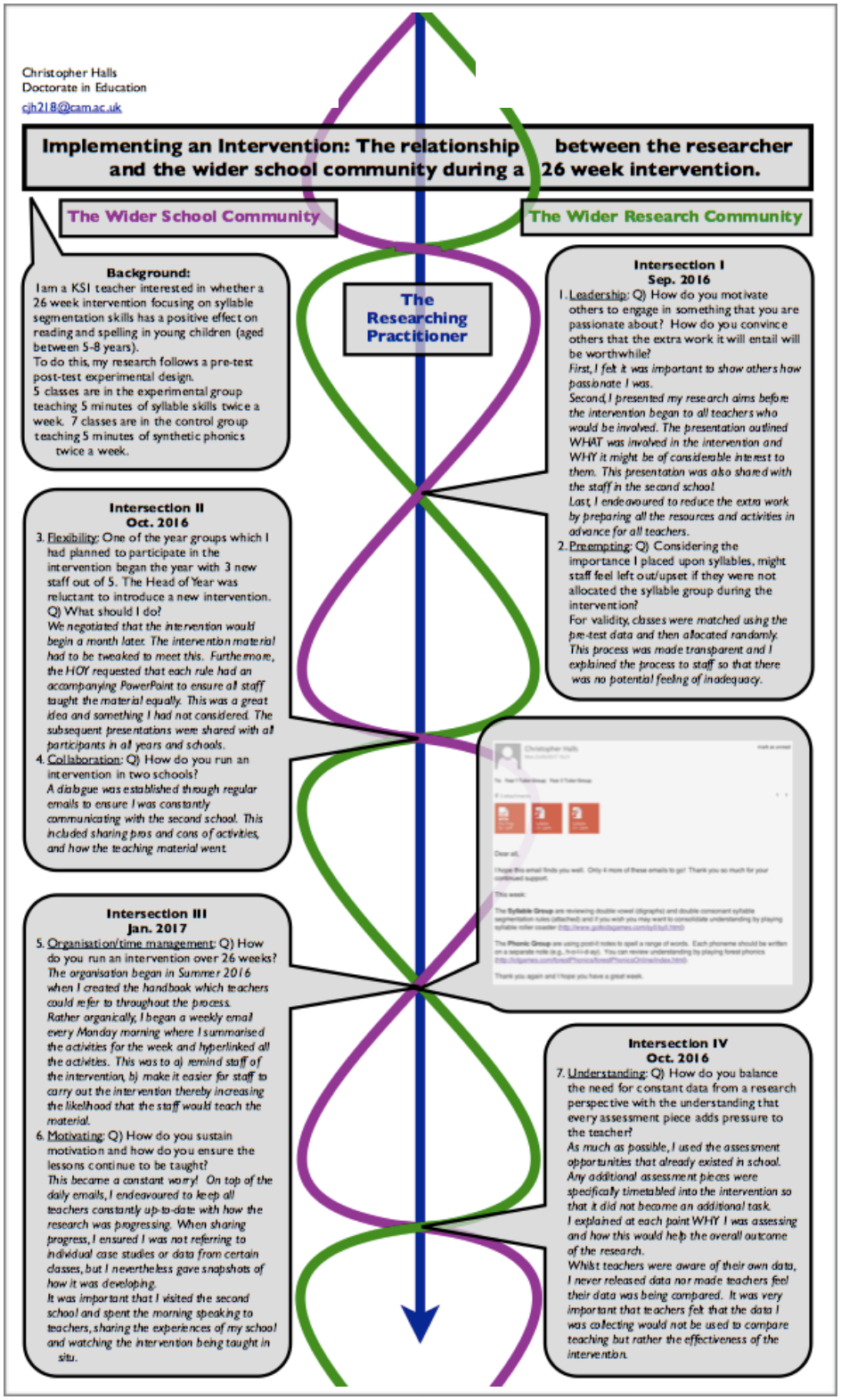
This is an interview on *date* with *name and ability*

I am going to ask you a few questions for 10 minutes or so. It is really important that you are as honest as possible. This is a fantastic opportunity for you to tell me exactly how you feel and nothing you will say will upset me. Let us begin:

Q1. Do you like writing?
Q2. Why/Why not?
Q3. Do you like reading?
Q4. Why/Why not?
Q5. What do you like most about reading/writing?
Q6. Why/Why not?
Q7. What do you not like about reading/writing?
Q8. Why/Why not?
Q9. What can you do to help you read?
Q10. What can you do to help you spell?

(H) 8, EdD Conference 2017 Poster

Below is a copy of the poster I presented at the EdD Conference in 2017:



(H) 9, Inside Government Phonic Conference Slides

Below is the second slide from the 2018 Inside Government Phonics Conference I presented at:

For the full conference slides please see the following website:

Website link to conference material removed as this information was only intended for the examiner.

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